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Volume 45

Article 1

1-1-1958

Ames Forester Vol. 45

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THE FORESTRY CLUB
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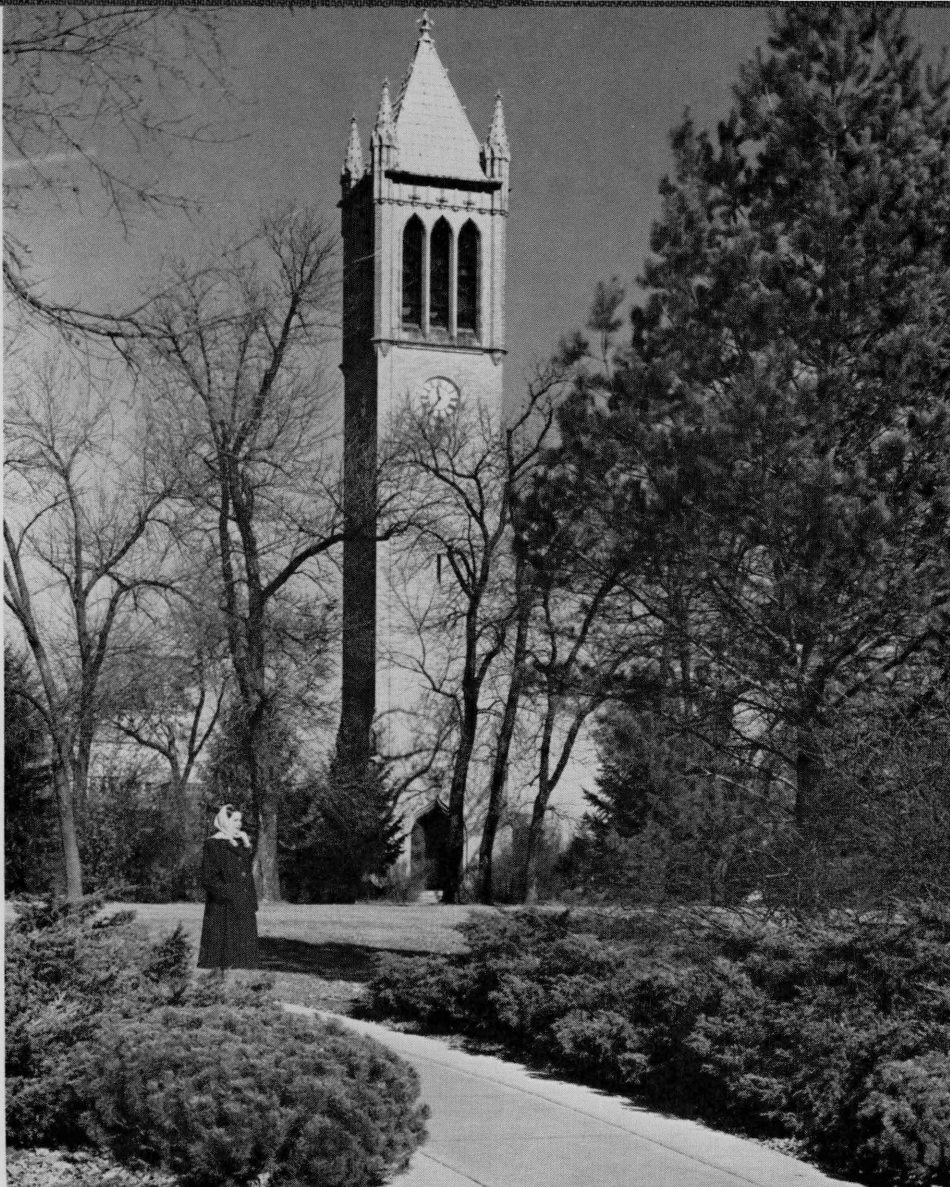
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ACKNOWLEDGEMENT

The perpetuation of a yearbook such as the Ames Forester involves tremendous responsibility, not only for those on the staff, but also for all the students and alumni of the institution by which the annual is published. To all of those who have contributed by purchasing this years annual, by becoming a patron, or by contributing their time to the publication goes a sincere debt of gratitude from the entire staff.

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THE FOUNDERS of Iowa State College 100 years ago were launching into a new field of education which was to be characterized particularly by a willingness to try new methods, to educate in new fields, to respond to the needs of the people and of the times.

Accordingly, the College offered in 1874 what may well have been the first course in forestry to be taught in the United States. In 1904 it began the professional training of foresters, thereby becoming one of the early schools among the 25 now recognized.

This sort of forward-thinking has been responsible for the remarkable growth in size, in influence and in prestige which has been the good fortune of the College over the past century.

As we celebrate this year the Centennial of the founding of the College in 1858, let us pledge ourselves to meeting the problems of the new century and seeking its opportunities as vigorously and as successfully as have those who came before us.

To the future, then, and to the bright promise which it holds for forestry and foresters let this book be dedicated.

JAMES H. HILTON, President
Iowa State College

In Memorium

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THE FORESTER

By Monroe Bush

A forester stands at a gate between two worlds. Pass through this gate in one direction and you come into the intricate world of human technology; pass through the opposite way and you enter the perfection of God's natural world.

The forester is the gatekeeper. More than any other man he determines the effect of one world upon the other. Whether the hunger of technology for raw materials will exhaust the earth, or the earth provide a sustained flow of resources for the well-being of mankind, is to a great extent the responsibility of the forester.

Trees and their forest communities are a fulcrum upon which the entire natural world of renewable resources is balanced. He who manages the forest manages the key to an undiminished yield of the earth's living abundance. The harvest of timber must be adequate for every industrial need, yet this harvest must not jeopardize a maximum forest growth. Neither must the harvest depreciate the role of the forests in building and maintaining a fertile soil, in the management of rainfall, or in providing an essential habitat for wildlife and a no less essential sanctuary for men. Thus to obtain the wood resources which are demanded by the present and, at the same time, assure an adequate future supply of not only wood, but those other resources which our timberlands sustain, is the forester's challenge.

To succeed, he must bring to his critical challenge not only complex technical skills and a vast knowledge of his profession, but those human qualities of vision, diplomacy and broad judgment without which no man can accomplish an important work.

How well he mediates, then, between these two worlds of technology and forestry, to what degree he can correlate industrial appetite with sound woodland management, will determine the health of the living earth for not only this generation, but for as far as the mind's eye can see. And by this means, ultimately, the forester will determine in large measure the welfare of our civilization.

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THE COVER

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Putting Quality Back in the Forest

J. A. HALL, Director

*Forest Products Laboratory,¹ Forest Service
U. S. Department of Agriculture*

A FEW YEARS ago one of our best known radio commentators was flying from Florida to New York. Chancing to look down upon the green earth, he was seized with inspiration. That night, over a national network, he waxed lyrical to millions about the vast forests he had gazed upon and the solid reassurance they have given him—from a couple of miles up—of our country's luxuriant timber resources.

I don't know whether that commentator ever came down to earth, either literally or figuratively, for a closer look at those woodlands. Knowing something about the forests he flew across, however, I suspect that his inspired lyric might have hit a discord or two had he done so. In any event, his appears to have been a case of reversing the old saying. He couldn't see the trees for the forest.

Yet he was right about one thing. Our forests have amazing recuperative powers. Unfortunately, though, their way of recovering from decimation—whether by man's ax, fire, or natural causes—all too frequently takes a course that runs at variance with man's needs and best interests.

To foresters, the story of what has happened to our magnificent forest heritage over the course of 300-odd years is a familiar one. Essentially, it has been too often a case of constant high-grading—of taking out the best, and leaving the rest. In New England, the South, the Midwest, the Lake States, the trend has continued longest, and there the effects are most apparent. But few areas throughout this land remain immune.

Why did it go thus? The answer, of course, is simple enough. Like the housewife who sorts over the piles of fruits and vegetables in a supermarket, loggers naturally picked out the best. And that meant the highest quality, as they judged tree quality in their time.

Sort over the same pile of apples long enough and you leave only the culls. It's the same way with forests, only worse; there you take away the prime breeding stock, leaving the rejects to proliferate unchecked.

And so we have pretty well removed the high quality timber from many of our once-proud forests. We're now up against the job of putting it back, and that is no simple task. In many cases, we can't restore the forests to what they once were. Nor should we. Our needs for wood have changed, too, and with them our standards of quality.

There'd be little point, for example, in replanting the Lake States wholesale to white pine at the expense of the spruce and fir needed by the paper mills and the birch, maple, and other hardwoods extensively used by the furniture factories, millwork plants, and plywood mills. Instead we need to understand what existing industry needs in the way of quality, and manage our forests for them.

And that brings us full up against the job of deciding what we need in the way of wood quality in our trees. For a number of reasons that is no easy job. In fact, it's a job that forestry is only beginning to contemplate. The realization is coming strong that it isn't enough to grow lots of trees. Timber growth must be consciously controlled to meet use requirements.

But in making such decisions, foresters are dealing in assumptions that will have to hold good over a long period of time—the time it takes to grow a forest. And there are almost as many criteria of quality as there are kinds of wood and uses for that wood. So we need to define what we mean by "quality."

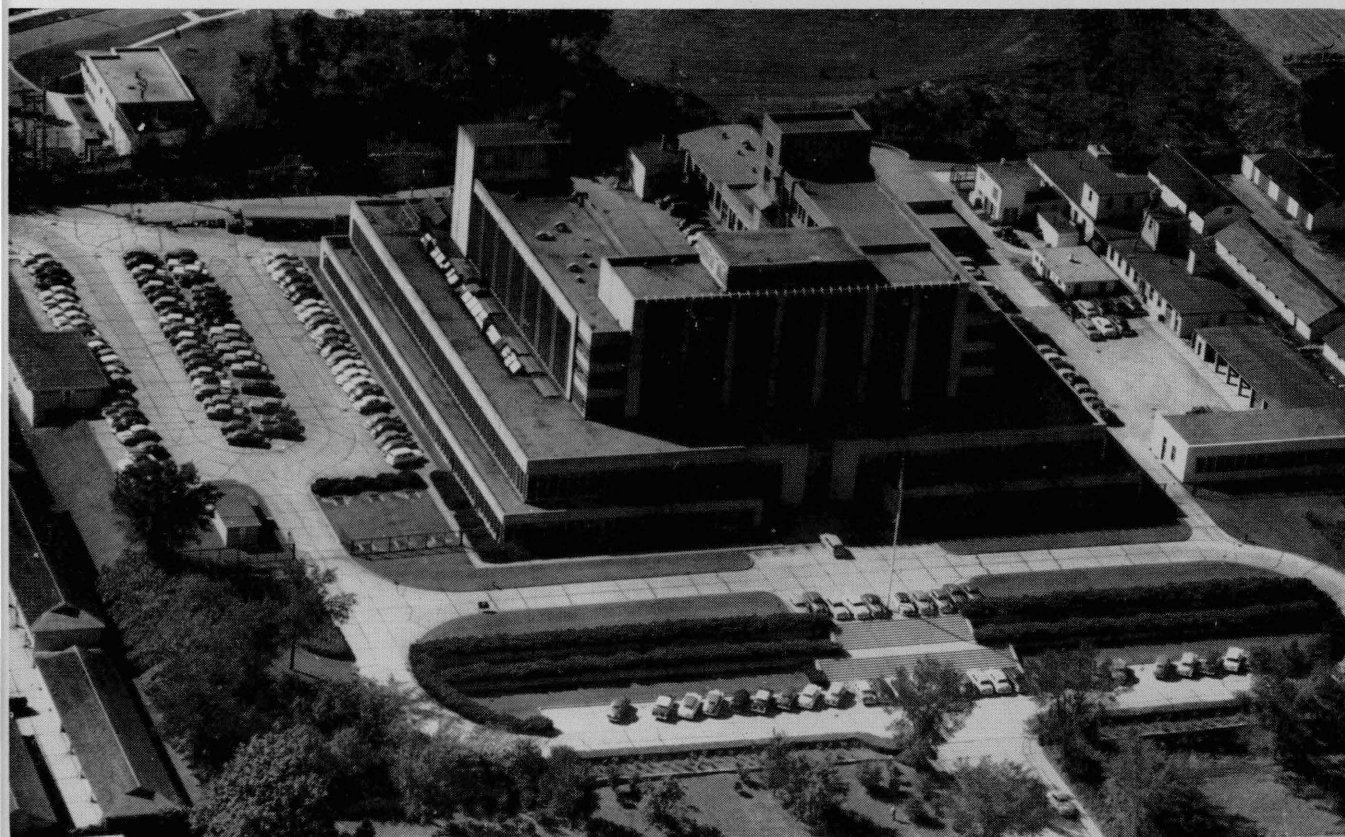
One definition of tree quality that has been widely discussed is as follows:

"A high-quality tree is one with a high proportion of its net volume in wood suitable for conversion into the higher grades of the more valuable end products and in sufficient quantity ordinarily to justify its economical harvest for such products."

That definition is clearly based upon the value of wood in the marketplace. Whatever uses create the greatest demand and bring the highest returns are the determinants of high quality. From the forest owner's and manager's standpoint, that would be hard to quarrel with. He's raising trees for market, just as the farmer raises corn and the rancher cattle.

But what kind of wood is classed as high quality on the market?

¹ Maintained at Madison, Wis., in cooperation with the University of Wisconsin.



Aerial view of the U. S. Forest Products Laboratory at Madison, Wis.

To get sound answers to that question, foresters need to examine what it is that constitutes high quality — not for one product, but for many. And since this examination needs to be tied directly to existing and potential markets for wood, it becomes in a practical sense a market study for a given forest or region. The forester must answer the question, what am I raising trees for? When he has that answer, he can decide what kinds and qualities of trees to aim for.

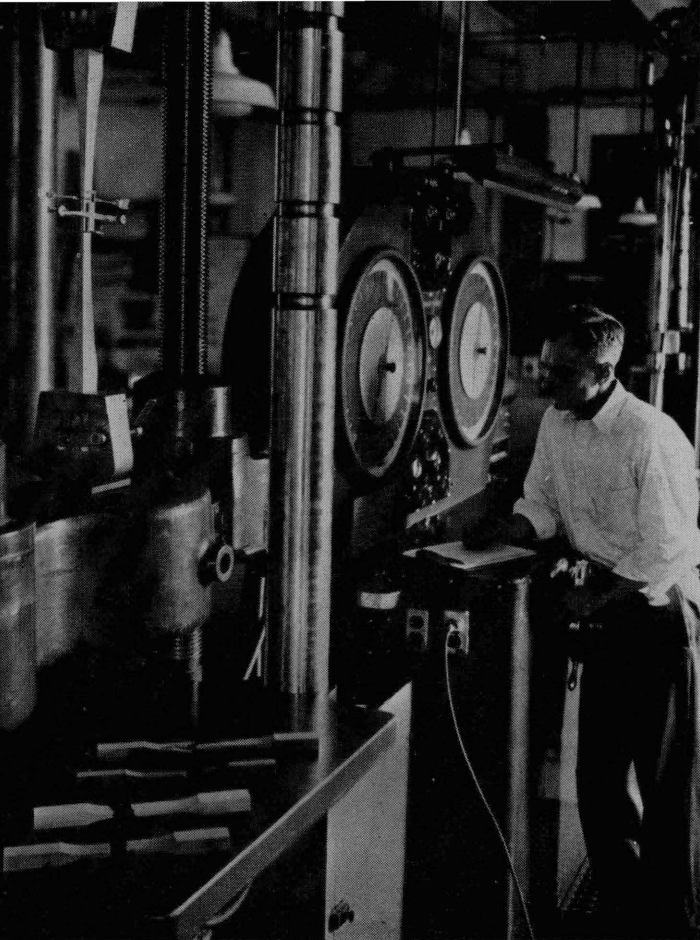
For industrial foresters, of course, this question is often settled in advance. They're employed by paper mills, lumber companies, plywood mills — the whole gamut of forest products — to manage forests from which future supplies for those industries are expected to come. But even here, the door is not necessarily closed to management with other markets — and qualities — in mind. In fact, it may be seriously challenged whether a forest can be managed to best advantage and profit for one type of product alone. Rare indeed is the forest that does not produce a range of qualities. There are always the inevitable thinnings, culls, harvesting offal, and other materials that need to be utilized if maximum efficiency is to be attained. It follows, therefore, that even an industrial forest managed primarily for, say, a paper mill needs other outlets for much of its wood. Intelligent management provides such outlets. The ultimate in such management is, of course, a well diversified industrial complex in-

cluding lumber, veneer, fiber, and even chemical plants.

At the other extreme, from the management viewpoint, are forests whose owners have neither business ventures nor established markets for their output. In that category are the bulk of our farm and other small woodland holdings. Generally these are dependent on guidance of public foresters. Few can afford to employ a private consulting forester. The problem of the public forester is greatly intensified in most such instances by the indifference of the owner, but that is another story. My purpose is to point out that there is an expanding body of technical knowledge available to help foresters grow the kinds of qualities of timber that will provide best returns.

What are the characteristics of wood that establish its quality? We have learned quite a lot about that, and are digging constantly deeper into it. As I've already indicated, there is no simple, pat answer that covers all cases. The blunt truth is that wood that may rate high quality for one use may rate low for another. Quality, therefore, is a relative term.

For example, the hardwood plywood manufacturer's definition of quality may well be considerably at variance with that of the softwood plywood producer. What the cabinetmaker looks for as to quality is likely to be considerably different from what the house carpenter wants. Similarly, the pulpwood buyer looking



Painstaking strength tests of wood of many different species at the U. S. Forest Products Laboratory has produced much factual information relating wood's mechanical properties to conditions of tree growth. Here a tensile test is in progress.

for high fibre yield is likely to choose something quite different from what the producer of telephone poles selects. The specific collection of quality elements that makes wood most suitable for a given use even applies to fuelwood.

Research on the characteristics of wood that are most directly related to its properties has clearly established several as highly useful indices of quality. Foremost among these is density, or specific gravity, which has been shown to have a close mathematical relationship to most mechanical properties. In static bending strength, for example, the modulus of rupture varies as the $1\frac{1}{4}$ power of specific gravity, and modulus of elasticity varies directly with specific gravity. Compression parallel to grain also varies directly with specific gravity, while hardness varies as the $2\frac{1}{4}$ power.

Research has also established that, within a species, there are marked variations in specific gravity of the wood, and that these variations are closely linked to heredity as well as to conditions of growth and stand management. It is an established fact that, of two trees that meet every requirement of the silviculturist as to size, form, straightness, clearness of bole, and so on, one may contain wood of low specific gravity and the other wood that is relatively high in this characteristic.

The proportion of summerwood to springwood in the annual growth ring, which appears to be strongly correlated with moisture supply during the summer months, is probably the best index to specific gravity. Another key to wood density is age—the older the tree, the greater the specific gravity of the current growth. Rate of growth also influences specific gravity. In most hardwoods, the faster the diameter increment, the greater the specific gravity. Yet the reverse is true for certain softwoods; open-grown trees tend to produce wood of lower specific gravity, especially in early life.

This density factor raises fundamental questions of stand management. In growing some of our better hardwoods, for example, should the forest manager aim for low or high density? The former is preferred by the furniture industry because of superior machining properties, more attractive grain patterns, somewhat less tendency to warp, and lower freight costs on the finished product. At the other extreme are such uses as tool handles, athletic equipment, structural members of heavy equipment, pallets, picker sticks, flooring, and the like that require the high mechanical strength and shock and abrasion resistance found in high-density wood.

But density is by no means the only characteristic of wood that determines quality for a given use. There are such things as compression wood in softwoods, tension wood in hardwoods, nonuniform growth, cross grain, and compression failures.

Compression wood, produced on the underside of leaning softwoods, is an abnormal structure characterized by large fibril angles, excessive shrinkage, and low mechanical strength. It can cause severe crook and twist in lumber.

Tension wood, formed largely on the upper side of leaning hardwoods, is an important cause of warp in lumber and veneer. The gelatinous fibers typical of this abnormality show up as fuzzy areas that are difficult or impossible to machine or finish smoothly. Nonuniform growth also affects machining properties and the tendency to warp.

Severe cross grain may be attractive in face veneer, but cannot be tolerated in poles, piling, structural lumber or other uses where high strength is essential. Neither can compression failures, which are mechanical fractures of fibers across the grain, usually attributable to severe wind storms or rough handling during logging or milling.

In this short paper, I have not touched upon such management tools as pruning. I think it is well enough understood that knot-free lumber generally brings a better price in the marketplace than knotty lumber. Grading rules generally reflect this, and forest managers will have to decide on the economics of pruning. Suffice it to say that I believe clear wood will always command a better price in the lumber yard, provided it is of the right quality for the intended use. It is with the intrinsic quality of sound wood, both clear and with tight knots, that I am chiefly concerned

— with its density, rate of growth, uniformity of growth, fibril angle, grain direction, and so on.

There is one other fundamental aspect of this subject of wood quality — that of tree breeding. Past work along these lines has generally overemphasized growth rate and appearance — straightness of bole, branching habit, and the like. We are well enough along now to know that growth rate and appearance aren't necessarily related to high wood quality, any more than big size in cattle means high milk production or top-quality beef.

Obviously, we are going to have to breed trees for wood quality if the science of genetics is to play its proper role in forest management. In this respect, timber management is a long way behind animal husbandry and farming generally. But I am confident that the same measure of success can be attained by true tree farmers as is being gained by agriculture. If corn can be bred for starch content, why not trees for superior density, long fibers, attractive figure, or any other desirable characteristic?

There are those, of course, who predict that changing use requirements for wood will render unneces-

sary any effort to grow high-quality timber. I have no qualms on this score, because I am confident that good quality will always find paying markets, with wood as with beef or wheat. One reason for this is that I see no conflict between growing trees for quality and growing them for quantity. As with hybrid corn, the two can go together. I think we can raise high-quality trees in quantities ample to keep unit wood prices down to competitive levels even for such items as lumber for light construction. And maintenance of quality standards will provide added assurance that wood will keep and expand such markets in the face of competition from other materials.

This matter of putting back the quality our forests once had is no insuperable task. We need no vast capital investment in plants such as producers of other materials must have. The forests are our factories; we need only to guide what they produce.

Let me close this with one further look into the crystal ball. I see in it forests that one day will justify the conclusion, by men who fly above them, that here indeed are vast stores of raw wealth from which our Nation can continue to draw for all its wants.

Photos used in this article — Courtesy U. S. Forest Service

ABOUT THE AUTHOR



J. A. Hall received his bachelor's degree in 1921 and Master's degree in 1922 from University of Wisconsin, and a Ph. D. from the same institution in 1934.

After several years spent in special research for nationally known fruit, food, and tobacco firms, he was named in 1930 to the staff of the Forest Products Laboratory at Madison, Wis., where he carried on biochemical investigations related to the production of turpentine and rosin from southern pines.

1937-39. Associate Director of the California Forest and Range Experiment Station, U. S. Forest Service, with headquarters at Columbus, Ohio.

1942-45. Principal Biochemist for the U. S. Forest Service, Washington, D. C. Served as consultant and technical adviser in biochemical phases of the guayule rubber project with field operations at Salinas, Calif., and was also engaged in developing the wood conversion and utilization programs of the Service. He took an important part in bringing about the building of the \$3,000,000 alcohol plant at Springfield, Oregon.

1945-April 1, 1951. Director, Pacific Northwest Forest and Range Experiment Station, U. S. Forest Service, Portland, Oregon.

April 1, 1951-Director, Forest Products Laboratory, Madison, Wis.

Member of American Chemical Society, American Wood Preservers' Association, Forest Products Research Society, Society of American Foresters, Phi Beta Kappa, Sigma Xi, and Cosmos Club.

Alaskan Forestry Opportunities

A. W. Greeley

Regional Forester

U. S. Forest Service — Region 9

ANY DEVELOPING frontier area is an area of unusual opportunity. It has been popular in recent years to emphasize frontiers of the mind. And certainly there are many frontiers of the mind. But there still remain areas that are physical and economic frontiers. And Alaska is one of them. In a unique way, it is a forestry frontier.

Do you like to hunt? Or fish? I mean hunt—in areas where the bag limit may be three deer some

seasons. Or where, with some persistence, you can do the unusual, like a moose hunt, or a hunt for Alaska brown bear, or mountain goat. And the fishing is just as unique. Do you prefer 15 pound salmon, or 50 pound? Or would you like to get into a remote lake where once in a while you can pull out a trout with every second or third cast. If this sort of weekend sport seems alluring, you should be interested in finding out about forestry work in Alaska.



Narrow passages, tidal currents, and tricky navigating by small boat require foresters to develop a new set of skills to work in Southeast Alaska. This is Sergius Narrows, off the coast of Prince of Whales Island.



Typical stand of Sitka spruce and western hemlock plup timber. Timber like this, cut under 50 year timber sale contracts offered by the U. S. Forest Service, is the raw material around which a new Alaska pulp industry is building.

But that is just one facet of Alaska. The forestry job in Alaska is opening up now, just really getting a good start. Men who go to Alaska any time in the next 10 years will be getting in on the ground floor in the development of forestry and forest industry in what is almost a brand new region. There is no other place in the United States where foresters, or people interested in forest industry, may do that.

First, though, let me give a quick background description of the Territory of Alaska. It is big. You could comfortably fit half a dozen mid-west states into its land area. There are differences in climate, in vegetation, and in living conditions from one part of Alaska to another. You hear of midnight sun in summer and 24-hour nights in the winter. That is true for part of Alaska. You hear of sled dogs and Eskimos, and primitive living conditions. That also is true, for part of Alaska. And you hear of bustling cities, of paved new highways, and of extensive military construction all over the territory. That is also true, and also for part of Alaska. One cannot adequately describe the climate and people of the United States in a single paragraph because there is so much variation. For precisely the same reason, one cannot describe the climate and people of Alaska in a single paragraph.

For purposes of discussing forestry, let us divide Alaska, as the Alaskans do, into southeast Alaska and the "interior." Southeast Alaska constitutes the panhandle. The "interior" is the rest of Alaska, except that that term does not usually include the Aleutian Peninsula and islands, nor does it include the Arctic slope. The forestry problems and opportunities differ markedly between southeast Alaska and the interior.

Southeast Alaska is correctly described as an archipelago. As you fly to Juneau, you get the impression of extensive, bare mountain tops, many islands, fairly narrow waterways, and uneven patches of timber, mostly nestled fairly close to the water's edge. Three of southeast Alaska's communities are on the mainland. The others are on islands. All of them are on salt water. Consequently the water, and means of getting around on it, or over it, comprise a main aspect of life in southeastern Alaska.

Most of the timber grows close to water, below elevations of 1200 feet to 1500 feet. Of the over 80 billion board feet within the Tongass National Forest, which covers much of Alaska's panhandle, it is thought that three-fourths or more lies within two miles of salt water. Construction of main roads is, therefore, not a serious problem for the forester. He has, instead, to

learn how to get around on the water in all seasons of the year.

The timber species which grow in southeastern Alaska consist of western hemlock, Sitka spruce, and two cedars, western red and Alaska-yellow. Hemlock and Sitka spruce are excellent pulping species, being suitable for processing by several different pulping methods. These species in Alaska have not heretofore supported a large sawmilling industry because the stands are very overmature, and defect is extensive. However, individual trees here and there in the stands are of sawlog or veneer quality. For these reasons, an extensive forest industry in southeast Alaska must be based on pulp mills that can operate successfully on timber too poor for sawmilling. Once pulp operations are under way, there is room for some more sawmilling and plywood production.

The period from 1951 to 1957 has seen a pulp industry come to Alaska. During that period, the U. S. Forest Service has committed 4 large blocks of timber on long-term sales under contract conditions that require the purchasers to build pulp mills in Alaska. These are all fifty year sales, and comprise the largest sales made anywhere by the Forest Service. The total volume of timber included is around 24 billion board feet. A 300 ton a day mill, built in Ketchikan between 1952 and 1954, has been in operation for over three years. During the late summer of 1957, work commenced on a mill of about the same size at Sitka, with start-up scheduled for 1959 or 1960. The two other timber sales contracts should result in mills near Juneau and Wrangell, with construction to start in the early 1960's.

The spruce-hemlock type must be clear cut in blocks to assure natural reproduction. Otherwise too many acres are lost to brush. Extensive clear cutting operations were not feasible until a market for pulp timber came into being within Alaska. Consequently, it has only been within the last 3 years or so that intensive management of parts of these timber stands has been possible.

Well, how does this set of circumstances bring about any forestry opportunities? New pulp mills are going in all over the country. What is so different or unique about new pulp mills in southeast Alaska?

Several things are unique. In other parts of the country where new pulp mills are being established, they simply follow a pattern in forest management that has already been developed by earlier operations. In southeast Alaska, pulp operations go back only to 1954. There are unsolved problems on all sides. There is an increasing amount of work to do as the Forest Service and these purchasers staff up to man the new operations. And as each successive new operation comes into being, there also comes into being a new and totally different economic situation in southeastern Alaska, one that never previously existed. So, people who go up there now, or in the next ten years, will be there at a time when a pattern for a new economic era in southeastern Alaska is being established.

What are some of the problems for foresters to work on? Do you know any other place where basic work is needed on a yield table for a major forest type on which a major forest industry will depend? Do you know any other place where work now under way in studies of second growth stands constitute virtually the first systematic gathering of research information on the second growth stands of the dominant forest type? Those are typical problems of a region at the very beginning of its technical forestry experience. There are similar basic problems in cutting area lay-out, planning logging, best ways to build roads, dependability of seed sources, control of wind throw, and the whole range of "what to do" problems associated with active, intensive forest management in a new area.

One of the especially interesting facets of forest management in southeast Alaska is the close relationship between the management of the forests and the flow of the short, swift streams where salmon spawn and on which a large salmon-fishing industry depends. The west coast salmon industry has had serious ups and downs. Just now the Alaskan fishing industry is in doldrums because of low fish numbers. It is human for people to look around for something that can be blamed. Some want to blame logging.

The Alaska Forest Research Center has had a salmon stream study going for nearly 10 years now, aimed at providing factual answers to guide both the fishing industry and the forest industry. Following a calibration period, the watersheds of two "test" salmon streams will be logged, and two "check" watersheds will remain intact. Accumulated information on stream flow, silt deposition, debris in streams, number of fish entering to spawn, etc. can be compared and differences traced to broad causes. This work, which is original research in a virgin area, is of tremendous significance and importance to the entire west coast area where there are streams into which fish go to spawn.

Answers need to be found for even such ordinary questions as "What is the best equipment to be used for logging?" Tractor logging has not worked well. Some of the stands are not dense enough to support the costs involved in donkey logging. So, what to do? Here, and on questions about roads and other improvements, are opportunities for engineers.

There are forest problems and developing opportunities in interior forests too. First in importance is fire protection. A handful of Bureau of Land Management employees are supposed to protect from fire over 200,000,000 acres of interior Alaska forests and wildlands. It is a nearly impossible charge. Fires have burned over millions and millions of acres, much of it in repeat burns, and much of it from man-caused fires.

We as a people in the United States long ago decided that we could not afford such laxness for the wildland resources of the continental United States. We can no more afford such laxness in Alaska.

The nationwide forest survey is being extended to

interior Alaska. The technical problems of how to make a forest survey in a remote land, which is unpopulated and largely unphotographed, is one of the most challenging problems to face forest survey people in many a year. So too, when the time comes, will be the job of organizing the information obtained by the forest survey to put it to best use for the development of the Territory and the benefit of the people of the United States.

There now are timber stands in interior Alaska of a size and composition such that they could support an efficient-sized unit of industry. Before that can be done, however, there are tough economic barriers that must be cracked on present high freight rates, on adverse wage differentials, and on high-cost transportation from the stump to a water shipping point.

Now, just a word about living conditions. Interior Alaska is the land with cold winters, long winter nights, warm dry summers, and long summer days. In southeastern Alaska, the climate and the absence of roads makes a difference. Southeastern Alaska is warmed by moist air blowing in from the Pacific, and consequently has fairly moderate temperatures but a good deal of rain. Precipitation at Juneau averages 80 inches in a year, Ketchikan 140. Some summers seem to be rainy most of the summer. People who live there get used to it, think little of it. But to people who come to southeastern Alaska from a dry climate, it takes a while to get used to the rain.

The towns of southeast Alaska are not interconnected by roads. That's because of the steep topography, and the impracticality of building bridges from one island to another. So, residents of southeast Alaska get around by airplane, or else by boat. Forest Service field men travel mostly by boat. Fifty-foot ranger boats are provided as part of the ordinary working equipment on every ranger district. People are very friendly. Living costs are higher than they are in the Pacific Northwest. Government employees receive a 25% living cost allowance for work in Alaska. Living costs in the major southeast Alaska communities, when compared with Seattle, Washington, run from 22% to about 30% higher. For the towns and cities of interior Alaska, living costs run somewhat higher.

Alaska is a land of great contrasts. There is frustration, and challenge. There is drudgery, and breathtaking beauty. For those who will make it so, there can be the thrill of real accomplishment. And for a forester, the next dozen years seem to hold a promise of an especially intriguing series of rewarding professional opportunities.



About the Author

A. W. Greeley received his B.S. degree in Forestry from the University of Washington and M.F. from the Yale School of Forestry. He has been employed by the U. S. Forest Service since graduation in 1935.

Among his tours of duty with the Forest Service are included District Ranger, Project Timber sales Officer, and Assistant Supervisor on five different forests in Region 1; three years in the Division of Timber Management in the Forest Service; from 1947 to 1953, Assistant to the Director of the Pacific Northwest Forest and Range Experiment Station at Juneau, Alaska; and since November of 1956, Regional Forester of Region 9.

Photos used in this article — Courtesy U. S. Forest Service

Bring the Forest to Your Desk

KARL E. MOESSNER, *Research Supervisor*

*Forest Photogrammetry & Photo Interpretation,
Intermountain Forest & Range Experiment Station*

AERIAL PHOTOGRAPHY can bring the forest to your desk. Through aerial photos owners, managers, and field men now visualize the entire forest. Management plans, long dependent upon limited data from small field plots, can be amplified and checked under controlled office conditions through measurements made on the photos. Timber sales, access roads, recreational facilities, and even game management areas are planned through photo study. All forest mapping and most forest surveys are based on aerial photos. This wide acceptance by foresters of the aerial photo as a working tool parallels the development of photogrammetry and its use in many other technical and professional fields. Let us see why and how the aerial photo can help the modern forester.

What is Photogrammetry?

The American Society of Photogrammetry defines photogrammetry as "the science or art of obtaining reliable measurements by means of photography." This science is not limited to a single application such as mapping but is used in such widely diversified fields as astronomy, ballistics, and metallurgy.

Professor C. L. Miller¹, writing in *Photogrammetric Engineering*, states that it is essentially a method of making such spatial measurements as location, direction, length, size, area, and volume. Briefly stated it is a means of creating a precision model either optical or mathematical, which can be measured. Through stereophotography we can create a three dimensional model of the object of interest and then measure and study that model under office conditions. Essentially photogrammetry is an analogue process.² It can be used to measure any object which can be photographed, and offers the most advantage when visualization and measurement of the actual object are difficult or uneconomical.

¹ Miller, Charles L., The Spatial Model Concept of Photogrammetry. *Photogrammetric Engineering*, Vol. XXIII, March 1957, pp. 3-35.

² A process familiar to engineers and scientists whereby the object of interest is simulated by a more easily measured physical system.

Any forester who has fought his way up a mountain to reach a randomly selected but almost inaccessible field plot, and any forest engineer who has run preliminary road surveys through dense timber in difficult terrain, will agree that photogrammetry could be used to advantage on many forests.

To understand photogrammetric procedures we must understand the nature of the photograph. Geometrically speaking, the aerial photo is a perspective projection of the area photographed. The lens of the camera converges the rays of light on a single point while the film records the position of the rays on an intersecting plane. We can recover both the location of the point and the direction and intervening angles of the light rays. A single photo is therefore a graphical record of each point in space from a known camera position. The intersection of the rays from two camera positions fixes the location as well as the direction of each point photographed (fig. 1). The aerial camera can thus be considered a survey instrument operating from a position in space.

Binocular human vision operates in much the same manner (fig. 2). Our two eyes may be compared to two cameras, both of which record photos of the same object from slightly different positions. When the brain combines these photos into one image, intersection of the various light rays enables us to visualize the relative positions of objects we look at.

This process, whether done by aerial photographs or by the eyes, is essentially triangulation. The location of the cameras or eyes fixes the length of the base line. The angles subtended by the different points in space indicate their relative distance or position from the known location of the base line.

When we view two properly oriented aerial photos through the stereoscope lens, we duplicate normal human vision except that the perspective seen by each eye is created by the aerial camera. The base line is that fixed by the camera positions, the so-called "Giant Eye Base," of photogrammetry. It is 10,000 to 20,000 times as long as the normal human eye base of 0.21 foot. This amplification of depth perception al-

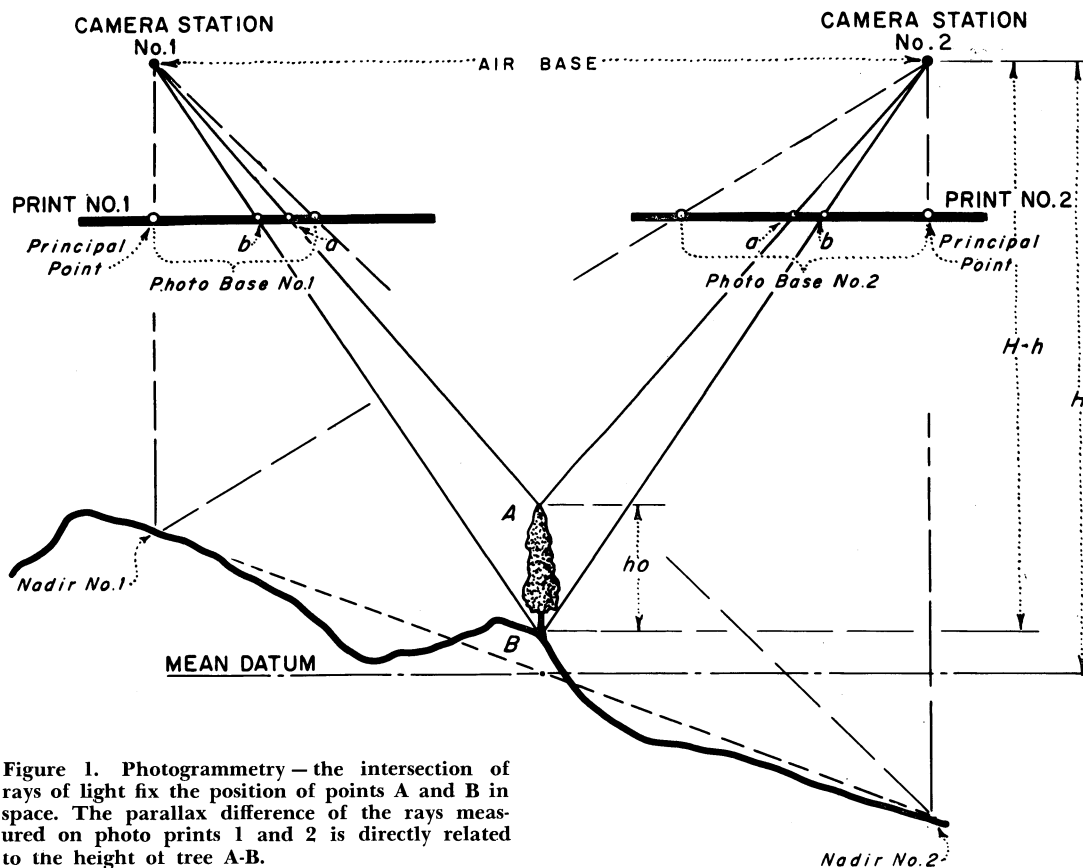


Figure 1. Photogrammetry—the intersection of rays of light fix the position of points A and B in space. The parallax difference of the rays measured on photo prints 1 and 2 is directly related to the height of tree A-B.

allows the viewer to see and make precise measurements of topography, vegetation, and man made objects important to the forester and engineer.

This conception of the stereomodel seems to indicate that it can be a reliable source of measurements indicative of such forestry necessities as species, stocking, soil, and site; stand size, volume, growth, and age; elevation, angle, slope, and distance. It opens an almost virgin field in forest mensuration, research, and engineering.

Foresters and Photogrammetry

In the past, foresters (along with others) have considered the aerial photo chiefly as a tool of the engineer and the forest mapper. They considered photogrammetry to be a science evolved to enable the mapmaker to use photos in determining the true location of objects and extent of areas. The increasingly complicated photogrammetric plotters developed to enable the engineer to use graphic methods in transferring points and lines from photos to the map manuscript were beyond the reach of most foresters. And the development of the simple, yet sufficiently precise, aids and techniques needed by foresters offered little profit to the instrument makers.

For these reasons, the average forester thought of his aerial photos primarily as glorified map sheets, not exactly to scale, but having many features and lines already plotted, and having the added attraction of three dimensions when viewed in stereo. He used a semi-matt print rather than a glossy because he wanted to outline the important forest types, so that they could be compiled into a standard type map. He welcomed modified infrared photos because in many areas the high contrast in these prints allowed him to separate hardwoods from conifers. Lack of definition in the black shadows was discouraging but not too much of a detriment to his type mapping.

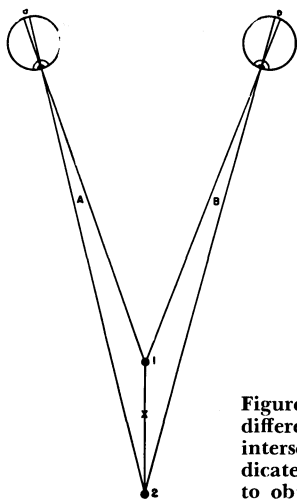


Figure 2. Human vision—difference in angles of the intersecting rays of light indicate the relative distance to objects.

He was a photo interpreter, an analyst, who had learned to identify certain qualitative information recorded on the photos by checking what he saw with what he found on the ground. Any photo measurement, even for scale determination, was only incidental to his interpretation of the photos. The spatial model viewed through his pocket stereoscope interested him only because it looked like familiar terrain.

The scope of aerial photo research was clearcut and limited under this conception. Researchers were expected to develop new and better ways of identifying species and cover types by means of such qualitative factors as tone, texture, and perhaps color. Many hoped that these technicians could improve the procedures followed in delineating type lines and entering type symbols on the photos. And, in cooperation with photogrammetric engineers, they were expected to design better, and of course cheaper, methods of transferring type delineations from photos to standard type maps.

But some foresters were not content with making qualitative interpretations only; they dreamed of the time when forest measurements would be made directly on the aerial photos. Throughout the last 30 years publications show an increasing interest in

the type of photo measurement useful to the forester. An early report by Ellwood Wilson³ to the International Silvicultural Congress in the late 1920's emphasized that not only could species and timber types be identified but *height and density could be measured and volume could therefore be estimated* from stereoscopic study of aerial photos.

During the 20 years after Wilson's report, publications on forestry and photogrammetry occasionally discussed the accuracy and the methods of tree and stand measurement from aerial photos. Some foresters, writing on the procedures for using these in type mapping, recognized the potential advantages of direct volume estimating but could see little hope of immediate application in forest surveys.

In the 1940's returning military photo interpreters gave new impetus to the foresters' interest in aerial photos. Many universities soon recognized the need for some training in these techniques and forestry curriculums were altered to include elective courses in photo interpretation. But these courses included little photogrammetry, and were usually tacked onto

³ Wilson, Ellwood, The Value of Aerial Survey in the Study of Forest Conditions. First International Silvicultural Congress Proc. 3:222-237. 1926.

AERIAL PHOTO STEREOGRAM

Loc.: San Juan Forest
Pagosa Springs,
Colorado

Elev.: 7,200'

Photos:

Date: 9/56

Scale: 1:23,300

F.L. 8-1/4"

Flying ht.: 16,000'

Par. fac.: 4.8' per .001"



1. Ponderosa pine, large sawtimber, P9bMP
Tot. ht.: 115/25' Cr. dia. 27/5' Cr. cov. 15/35%
Vol per A: 3,087 cu. ft. 20,940 bd.ft. Int'l Topo site: Lower moist slope 18%
Soil: Sandy loam with boulders Age cls: 4 (Keen) Site cls: III (Meyer)
Stand: 20"-36" pine with 6"-10" pine understory, open.
2. Ponderosa pine, large sawtimber, P9bWM
Tot. ht.: 135/30' Cr. dia. 25/8' Cr. cov. 45/35%
Vol per A: 5,150 cu. ft. 35,000 bd. ft. Int'l Topo site: Lower moist slope 30%
Soil: Sandy loam with boulders Age cls: 4 (Keen) Site cls: III (Meyer)
Stand: 12"-30" pine with Douglas-fir pole understory.

Forest Survey, IF&RES, U. S. Forest Service, Ogden, Utah

Figure 3. Aerial and ground stereograms are often used in training photo interpreters to recognize stand size and timber type on photos. Such stereograms are excellent training material in forestry courses.

PRELIMINARY AERIAL VOLUME TABLE - CONIFER SPECIES

Gross Cubic Foot Volume Per Acre by Average Stand Height, Average Crown Diameter, and Crown Cover

4- TO 7-FOOT CROWN DIAMETER

Average stand height (Feet)	Crown cover (Percent)									
	5	15	25	35	45	55	65	75	85	95
	----- Ten cubic feet -----									
0		10	30	45	55	65	75	85	100	115
5		20	40	55	65	75	85	100	120	140
10		30	50	65	75	85	100	115	140	165
15	5	40	60	75	85	95	110	130	155	180
20	10	50	70	85	100	115	135	160	185	210
25	20	60	85	105	120	140	160	185	210	235
30	35	80	110	135	160	180	200	225	250	275
35	50	105	140	170	195	215	235	255	280	305

8- TO 12-FOOT CROWN DIAMETER

0		15	35	50	60	70	80	95	120	135
5		25	45	60	75	85	95	110	130	150
10		35	55	70	85	95	105	125	150	175
15		40	65	80	95	110	125	145	170	195
20	10	50	70	95	110	125	145	170	195	215
25	30	70	90	110	130	150	175	200	225	250
30	45	90	120	150	175	195	215	235	255	265
35	70	120	160	190	210	230	250	270	290	310
40	90	160	200	230	250	270	285	300	320	330
45	120	200	240	270	285	300	320	340	360	380
50	170	250	280	310	330	345	360	380	400	420
55	220	300	330	355	375	395	415	435	455	475

13- TO 17-FOOT CROWN DIAMETER

0		20	40	55	70	80	90	105	120	135
5		30	50	70	80	90	105	120	150	170
10		40	60	80	90	100	125	145	170	195
15	10	50	70	85	100	115	135	160	185	210
20	20	60	85	100	115	135	160	185	210	235
25	30	75	100	125	150	170	190	215	235	255
30	50	100	130	160	185	205	225	245	265	285
35	75	130	170	200	220	240	260	280	300	320
40	100	170	210	240	260	275	290	310	330	350
45	130	210	250	275	295	315	330	350	370	390
50	180	260	290	320	340	360	375	390	410	430
55	230	310	345	370	390	405	420	440	460	480
60	280	360	390	415	435	450	465	485	505	525
65	330	410	440	460	480	500	520	540	560	580
70	370	450	485	515	535	555	575	595	615	635

Forest Survey, Intermountain Forest and Range Experiment
Station, Ogden, Utah, April 1956

18- TO 22-FOOT CROWN DIAMETER

Average stand height (Feet)	Crown cover (Percent)									
	5	15	25	35	45	55	65	75	85	95
	----- Ten cubic feet -----									
30		30	50	70	80	90	105	120	140	160
35		40	65	80	90	105	120	140	160	180
40	10	50	75	90	105	120	140	160	180	200
45	20	60	85	105	120	140	160	180	200	220
50	35	75	100	120	140	160	180	205	225	245
55	45	85	115	140	165	190	210	230	250	270
60	65	115	150	180	205	225	245	265	285	305
65	85	150	190	220	240	260	275	290	310	330
70	110	190	230	255	275	290	310	330	350	370
75	160	240	270	295	310	325	345	365	385	405
80	195	275	305	330	350	370	390	410	430	450
85	250	330	360	385	405	425	440	455	475	495
90	290	370	405	430	450	470	485	505	530	550
95	340	420	450	480	500	520	540	560	580	600
100	390	470	500	530	550	570	590	610	630	650
105	460	540	580	600	620	640	655	670	685	705
110	520	600	640	660	680	700	720	740	760	780

23- FOOT CROWN DIAMETER

30	10	50	75	90	105	125	145	165	190	215
35	20	65	85	105	125	145	165	185	210	235
40	30	75	100	120	140	160	180	205	230	255
45	40	85	110	135	160	180	200	225	250	275
50	55	100	130	160	185	205	225	245	265	285
55	70	120	160	190	210	230	250	270	290	310
60	85	155	195	225	245	265	285	305	325	345
65	120	190	230	255	275	290	310	330	350	370
70	155	225	265	290	310	330	345	365	385	405
75	205	275	305	330	350	365	380	400	420	440
80	245	315	345	370	390	405	420	440	460	480
85	290	360	395	420	440	455	470	490	510	530
90	340	410	440	465	485	505	525	545	565	585
95	385	455	485	515	535	555	575	595	615	635
100	440	510	540	570	590	610	625	640	660	680
105	510	580	610	640	655	670	685	700	715	730
110	660	640	670	690	705	720	735	750	770	785
115	615	690	720	740	760	775	790	805	820	835

Note: Stand height, crown diameter, and crown cover from photo
measurements of field plots. Volume from field measurements computed
by Forest Survey total height-DBH cubic volume tables.Based on 168 field plots taken in southeastern Idaho, southwestern
Wyoming, and northeastern Utah.

Aggregate deviation: Table 1.5% low

Standard error of estimate: \pm 48% of average plot volumeFigure 4. Aerial stand volume tables correlate gross cubic per acre volume with photo measure-
ments of stand height, crown diameter, and crown coverage.

that aerial photo techniques should be taught to already overloaded upperclass schedules. Proposals lower classmen, and that photogrammetric methods could supplement and even be substituted for courses in surveying, mapping, and road location, received little consideration. And the great potential of stereoscopic aerial photos (fig. 3) as a training aid in such courses as forest ecology, soils, and timber management was almost never utilized.

As statistical methods became an integral part of all forest inventories, many foresters questioned the need for complete type mapping as a step in volume estimating. Instead, they considered the detailed

measurement and classification of sample plots to be the most efficient and probably the most precise form of forest inventory.

This sampling approach meshed almost perfectly with the photogrammetrists' concept of the aerial photo. For the photo measurement of every group of trees in a forest is impractical even though photo classification may be possible. However, the detailed study and precise measurement of a great many sample plots becomes possible through use of the aerial photo; for these measurements can be made at any season, by personnel who need not see the area, in an office hundreds of miles away.

MEAN VOLUMES FROM PHOTO AND FIELD MEASUREMENTS

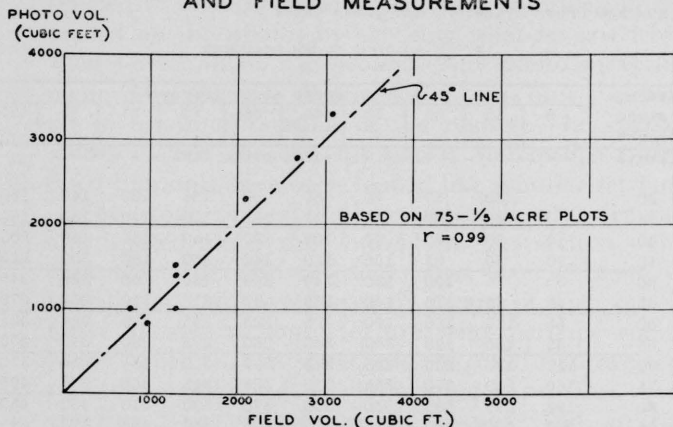


Figure 5. Photo volumes for a series of plots may correlate very well with those obtained in the field.

In the last 10 years, largely through the efforts of the National Forest Survey, Federal research in the use of aerial photos has been greatly increased. Incidental to this research, as well as to that conducted by other agencies, has been the construction and testing of numerous aerial volume tables (fig. 4). Procedures for aerial estimating have also been devised, and preliminary results of their use are encouraging.

Not all foresters have accepted the possibility of aerial estimating. The entire concept of the stereo-model sounds questionable to a forester trained only to look at aerial photos. The photo measurements of tree or stand height, or crown diameter, and of crown cover, sound new and different; many are suspicious of their value. The familiar terms "log length," "DBH," "form factor," and "number of trees" all precisely measured by the man on the

ground somehow seem more reliable as a basis for timber estimating. Foresters, even college professors, sometimes forget that both series of measurements are only indicative of that unmeasurable average — per acre volume (fig. 5).

But aerial survey companies, engaged in the highly competitive business of selling aerial photography and photogrammetric services to both engineers and foresters, are not influenced by precedents in forest estimating. They see a new opportunity — timber estimating — with great potential earnings, and are convinced of both the validity and economy of the photogrammetric process. Some of these companies already use photo-estimating procedures that old-line timber consultants and practicing foresters hesitate to accept.

The Position of Today's Graduate

Today's graduating forester has opportunity in a new field almost unknown to the forester of 10 years ago, forest photogrammetry. In addition to a knowledge of forestry and the ability to obtain qualitative information needed by foresters from aerial photos, this individual needs to understand the mathematics and physics of the photo. He should have some training in statistics. Most of all he needs an understanding of how photo measurements are made and efficiency in measuring the photos can come only by experience, and this must usually be obtained on the job.

As man-day costs continue to rise, forest managers question not only the need for new surveys, but the methods to be used. The stock answer of all foresters, "First we'll make a timber type map" must now be qualified by answering the questions "What for?" and for "How much?"

The forest engineer who spends several months in the field selecting the route of a new access road

Figure 6. Preliminary road locations can often be plotted easier and with more precision on aerial photos than on available contour maps. On these 1:10,000 scale photos, parallax measurements of 5 feet are possible, and are comparable to the 20- to 40-foot contour interval usually found on topographic maps.



or who insists that a contour map is required before he can make a preliminary road survey also be questioned. For the latest photogrammetric procedure not only locates the approximate center line, but plans the cuts and fills directly from aerial photos without the intermediate step of a contour map (fig

Even the researcher in such fields as forest management, mensuration, soils, and engineering may be expected to show a refreshingly new burst of activity. For administration, in accepting the photogram-

metric concept, will immediately create a demand for new data and new tables relating photo measurements to management plan requirements. At the same time any research studies dealing with the forest as a whole will be expected to utilize photogrammetric techniques to speed answers and at the same time cut costs.

Truly, the graduating forester who has a working knowledge of the usefulness of aerial photos is likely to have a busy and rewarding future.

About the Author



Karl E. Moessner received his B.S. degree in Forestry from Iowa State College in 1930 and entered the U. S. Forest Service in 1933. He served as foreman in Raco and Pine River camps on Upper Michigan National Forest, and as fire planning and mapping specialist on the Supervisor's staff. At his suggestion, aerial photo mosaics covering parts of that forest were used as field sheets for this work. In 1938 he was transferred to the Superior National Forest where he perfected methods for using aerial photos in fire planning, visibility mapping, and trail location.

In January 1942, Moessner was called to active duty as 1st Lt., Field Artillery, U. S. Army, reporting to Ft. Des Moines, Iowa. After two years on numerous military duties, including several school assignments, he was transferred to the Air Force (Photo Intelligence). He served overseas with Hdq. 3rd Air Division 8th A.A.F. and now holds the rank of Lt. Colonel in active Air Force Reserve.

In 1945 Moessner returned to the Forest Service as Assistant Ranger and shortly afterwards accepted transfer to the Central States Forest Experiment Station, Columbus, Ohio, where he headed the photo interpretation for the newly organized Forest Survey of the Central States. After the initial survey was completed in that area, in 1954, he accepted transfer to the Intermountain Forest and Range Experiment Station, Ogden, Utah, where he now supervises research in Forest Photogrammetry and Photo Interpretation. He is author of numerous research papers and technical notes on the use of aerial photos in forestry and a member of the Society of American Foresters and American Society of Photogrammetry.

Moessner was born in Waterloo, Iowa in 1907, and married the former Evelyn Stover, also of that city. They have two children, Roger, an architectural engineer living in Columbus, Ohio, and Philip, a student majoring in commercial art at the University of Cincinnati, Ohio.

Wood—Raw Material for Plastics

WALTON R. SMITH

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SOME people are inclined to think of plastics as synthetic materials that can be molded into any shape and then hardened. In fact, that is about the way Webster defines a plastic. In the case of wood, however, the term plastic is frequently used to indicate changes made either by impregnating resins, by compression, or by remolding component parts after separation. Such separation can be mechanical or chemical. This paper outlines some of these procedures.

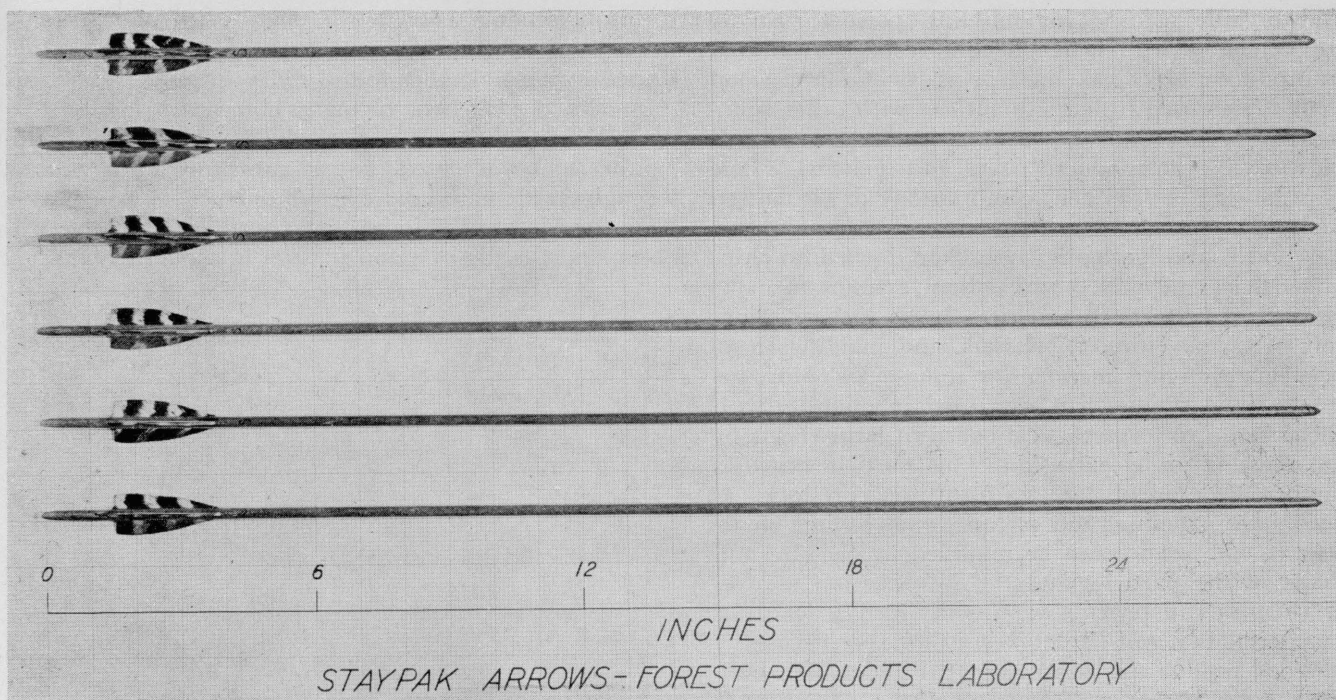


Left to right, half of an airplane tail wheel molded of compreg; a compreg specimen varying in specific gravity from end to end (1.3 to 0.6); a model airplane propeller molded of compreg; a cut panel of birch compreg sanded and buffed to show that the finish exists throughout the structure.

To understand these various methods of treating wood, one must remember that wood is about two-thirds cellulose fibers and one-third lignin, nature's adhesive that holds the cellulose fibers together. It is the lignin that softens with moisture, heat, and some chemicals; thus the lignin is the key to most wood plastics.

One of the simplest methods of making a wood plastic is to impregnate the cell walls, cell cavities, and intercellular spaces of wood with a bulking agent such as urea, melamine, or phenolic resin and then to cure or harden the resin by the application of heat. For thin veneers, the bulking agents can be put into the wood by soaking, but for thick stock like lumber, a pressure cylinder is often necessary. The wood product so formed is known generally as *Impreg*, although a number of trade names have been used. Wood treated in this way does not shrink and swell with moisture changes as much as normal wood, and it has slightly better fire resistance and decay resistance, but its strength properties are not materially changed except for a slight increase in hardness and some loss in toughness. Color can be added with the resins to give attractive built-in finishes. The major use for *Impreg* today is for die models in the automotive industry, where they provide carving and machining qualities of normal wood supplemented by much improved stabilization.

The synthetic resins that can be added to wood, as described above, have a plasticizing or softening effect on the lignin, and it is possible to compress wood so treated until most of the cell openings and intercellular spaces are closed. For most species of the temperate zone, this means compressing the wood to about half its original thickness. Then, heat is applied in the press, the resins cured, and a new, hard product is formed known as *Compreg*. This wood plastic, also known by trade names of Pregwood, Parkwood, Densewood, and others, is practically waterproof, very hard, heavy, almost fireproof, and very resistant to decay and insects. Sanding and buffing produce a high gloss finish, with no finishing



Birch Staypak arrows made in 1945. Some are still in use by the author.

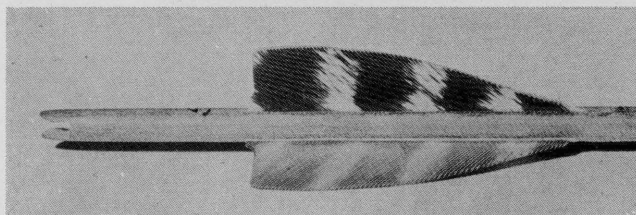
lacquers or varnishes necessary. Strength properties, except toughness, are increased about in proportion to the amount of compression. Toughness is reduced since the impregnating resin is brittle. Compreg found many war uses because of its excellent strength properties, durability, and good electrical properties. In peacetime it is used primarily for knife handles, picker sticks and shuttles for textile looms, and similar specialty uses. Although it is still rather expensive, its potential for many uses seems bright.

Because the impregnating resins cause brittleness and reduce toughness, scientists searched for some method of using the lignin in the wood as the binding material for compressed wood. It remained for Dr. Alfred Stamm of the Forest Products Laboratory to find the right combination of wood moisture content, temperature, and pressure to modify wood to a dense, high-strength, tough product without adding a resin or bulking agent. He called the new product *Staypak*. It has all the fine qualities of Compreg, plus the toughness. To illustrate its toughness, I made archery arrows $\frac{1}{4}$ -inch in diameter and 28 inches long from Staypak; without metal tips or plastic nocks, these arrows have served for over 10 years and have been driven up to $\frac{3}{4}$ -inch deep in solid pine wood without damage. In addition to being used commercially now for arrows, Staypak is used for textile shuttles and picker sticks and holds promise for many other products.

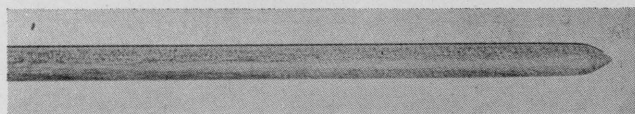
Another method of changing the properties of wood to improve its stability is known as acetylation. This is a chemical change supplemented by a bulking action, and it is brought about by first swelling the

wood with pyridine and then subjecting the wood to acetic anhydride vapors. The chemical action changes the water-attracting hydroxyl groups of the cellulose molecule to acetyl groups, and this plus the bulking action greatly reduces the shrinkage and swelling characteristics of the wood. The strength properties and color of the wood do not change, but resistance to decay and insects are improved. This product is not produced commercially yet, and remains on the laboratory shelves awaiting further developments.

Wood particles, such as sawdust, can also be treated with dilute acids, bases, or steam by a process known as hydrolysis to produce a cellulose-lignin molding powder with byproducts of reducing sugars, furfural,



The Staypak arrow can be self-nocked and the feathers are easily glued to the shaft.



Detail of self-point on Birch Staypak arrow.

and organic acids. This molding powder, usually supplemented with some phenolic resin, can be used to produce a black bakelite-type plastic. Ground wood flour is also used in large quantities with other resin-molding compounds in making black and colored plastics like telephones, pens, and pencils. These plastics can be either compression or extrusion molded.

Wood is also mechanically broken down into chips or particles and mixed with adhesive resins to make molded or flat-pressed products. Items such as paper roll plugs, novelties, toilet seats, and moldings have been made in this manner for some years. More recently wood residue has been used in quantity with cheap resins to form particle board in large sheets by flat pressing or by extrusion. This particle board is finding widespread use as furniture corestock, as decorative paneling, and as functional cabinet material. Its appearance can be modified by the size and shape of the particles and the introduction of dyes or chemicals to provide varying characteristics. It is a material that can be engineered for specific uses.

Wood residue can also be molded under high pressures, with natural lignin used as the adhesive, to produce fuel briquettes such as Prestologs and similar products on the market.

If wood is put through some pulping process to separate the wood fibers, then small amounts of synthetic resins can be added to produce flat-pressed or molded wood fiber products such as picnic plates, flower pots, typewriter cases, insulation board, or hardboard.

Paper from wood fibers can be impregnated with resins to form dense laminates molded under pressure

into a product known as *Papreg*. With photographic impressions on the surface sheets, these form the decorative table tops found today in most restaurants and in the kitchens of many homes.

Wood plastics are relatively new and just beginning to be accepted, not as substitutes, but as new engineered materials. The abundance of wood as a renewable raw material and continued research will expand the use of wood plastics in modern living.



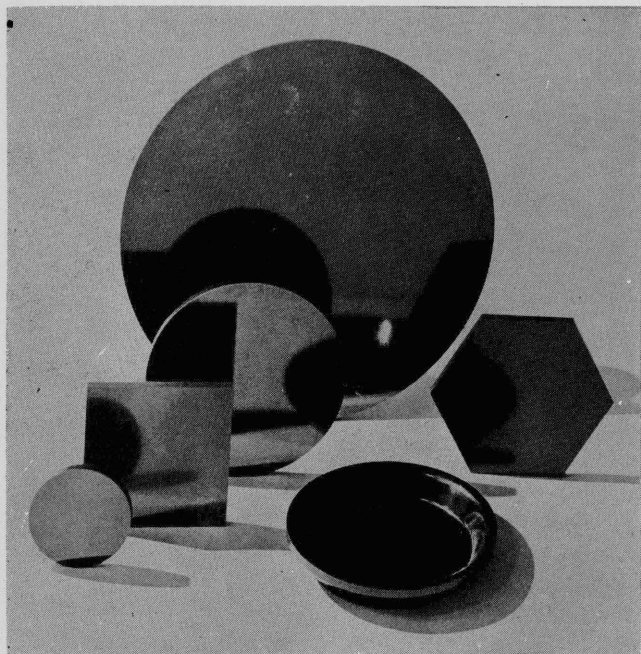
About the Author

Walton R. Smith was born in Charlotte, N. C., August 21, 1910, and attended the schools in that city. In 1928, he attended Davidson College, Davidson, N. C., for one year, following which he spent two years as a book-keeper in a bank in Charlotte, N. C. In 1931, he entered the School of Forestry, N. C. State College, and graduated with a B.S. Degree in forestry in 1934.

Immediately after graduation, he was employed on the Nantahala National Forest in western North Carolina and, subsequently, had assignments in National Forest administration in most of the southern states, transferring to forest research at the Southern Forest Experiment Station in 1938. For several years he assisted in flood control surveys in the Deep South, and was Project Leader on the Tallahatchie flood control survey in Mississippi when World War II broke out. He was immediately transferred to the Forest Products Laboratory where he worked as an assistant to the Chief of the Division of Wood Preservation on war work during the emergency.

Following the war he was transferred to the new Forest Utilization Service at the Southern Forest Experiment Station and, after a year in service at that point, was transferred to the Forest Utilization Service of the Southeastern Forest Experiment Station at Asheville, N. C. In 1950, Mr. Smith resigned from the Forest Service to organize the Walton Lumber Company at Mebane, N. C., a firm which he operated for two years prior to selling his interest and returning to forest research as Chief of the Forest Utilization Service at the Southeastern Forest Experiment Station at Asheville. He is currently holding that position and representing the Forest Products Laboratory in the southeastern states.

Mr. Smith is married and has five children.



Samples of hydrolized wood phenolic molded plastics.



Senior Section



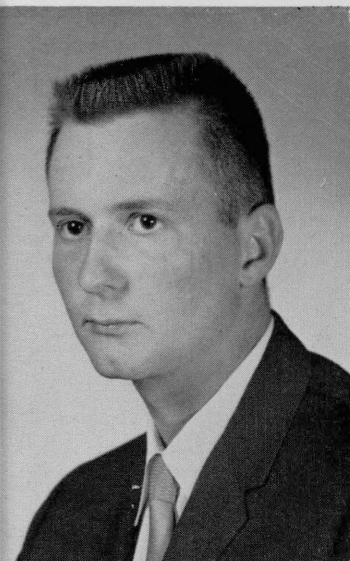
To the Seniors

This year Iowa State College celebrates the occasion of its founding one hundred years ago for it was in 1858 that a bill was introduced into the Iowa legislature providing for the college.

You who receive degrees this year are honored by being members of the centennial class. During the early years of the College much attention was given to forestry as one of the agricultural subjects. A course was offered in 1874 and instruction was expanded which resulted in a professional curriculum being established in 1904. As Iowa State has grown so has forestry.

Perhaps you who receive degrees this year will wish to adopt the slogan of the College Centennial observance and say, "with honor to the past... with vision for the future."

All of the forestry staff salute you of the Centennial class and wish for your success in all of your endeavors.

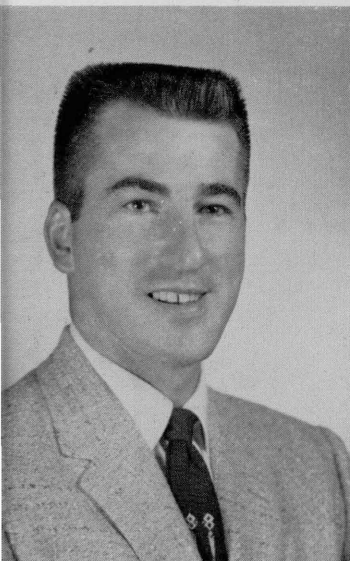


DAVID J. ALBRECHT—Nevada, Iowa—Summer camp, Oregon, 1955, Married.

Dave's interest lies in the management field and he plans to work for the U. S. Forest Service after graduation. His practical experience was gained on the Wallowa-Whitman Nat'l. Forest in the form of marking, cruising timber, and road location. His hobbies include music and reading.

MELVIN D. CLAUSEN—Traer, Iowa—Summer camp, Oregon, 1955.

Mel plans to work for private industry following graduation. He is majoring in forest management and has worked one summer with the Potlatch Forests, Inc. Mel is a member of the Forestry Club, Society of American Foresters, and the Ward System. His hobbies include hunting and fishing.



GILBERT L. COMSTOCK—Eddyville, Iowa—Summer camp, Oregon, 1956.

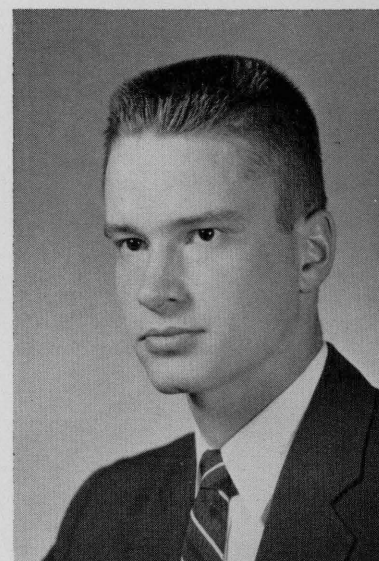
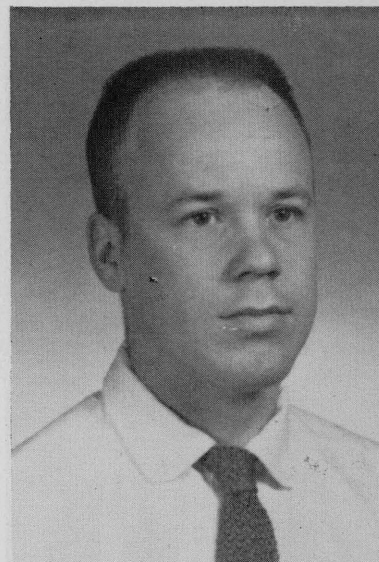
The editor of the 1958 issue of THE AMES FORESTER has been active in many activities. These include Forestry Club, Forestry Open House Co-chairman, Alpha Zeta, Marching Band, Scabbard and Blade, IFC, Forestry Club Vice-President. Gib is majoring in utilization and plans to study for an advance degree in business after a short term in the service. His main hobby is music.

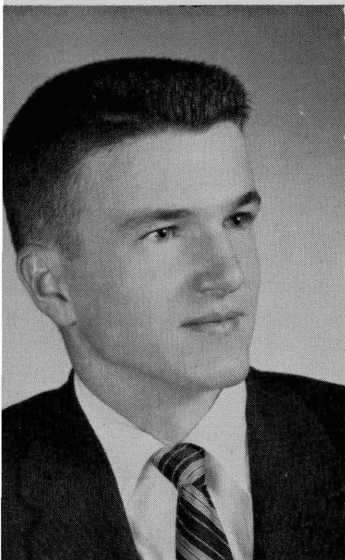
WILLIAM F. CONKLIN—Urbana, Illinois—Summer camp, North Carolina, 1957.

Bill is one of the men in the Range Management Option in Forestry. He plans to work for the Forest Service upon graduation. His hobbies include hunting, fishing, and golf.

CLIFFORD E. FAGO—Winthrop Harbor, Illinois—Summer camp, Oregon, 1955.

Cliff is a member of Alpha Zeta and Forestry Club. His plans upon graduation are as yet not decided, but he is in the management option. He spent the summer of 1957 as a Fire Control Aid for the ELM in Alaska. His Hobbies include canoeing and flying along with hunting and fishing.





RICHARD D. FREEL—Des Moines, Iowa—Summer camp, Oregon, 1955.

Dick plans to work for the BLM in the mangement field after graduation. He has spent two past summers in the employment of this agency. He has been active in the Forestry Club and has served as vice-president. His hobbies are sports and mountain climbing.



HUGH B. HARDIE—Clarinda, Iowa—Summer camp, Oregon, 1955.

Hugh is a forest management man and plans to work in some field of forestry after completing his tour with the uncle. He worked for the Potlatch Forests, Inc. at Lewiston, Idaho for his practical experience. He served the Forestry Club as secretary and belongs to the Society of American Foresters and is a SAAC member. His hobbies include tennis and swimming.



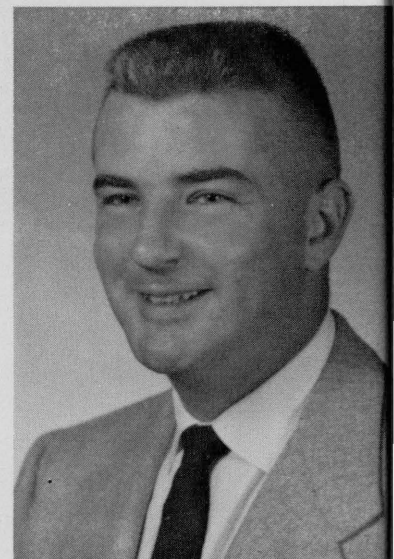
WILLIAM L. JENSEN—Council Bluffs, Iowa—Summer camp, North Carolina, 1957, married.

Bill's interest lies in the selling end of forest products and plans to pursue this in private industry following graduation. He has worked on Veishea, Varieties, and was a member of the Prom-enaders. His outside interests include woodworking and target shooting.



ROBERT E. HETZER—Tipton, Iowa—Summer Camp, Oregon, 1956—married.

Bob graduated in forest management in December, 1957, and went to Oregon to work for the Forest Service. His previous experience included Timber Type Mapping in the Willamette Nat'l. Forest and work in the Forest Pathology Lab. at ISC. He was affiliated with the Pi Kappa Alpha fraternity.



FAYE LAWRENCE HOUTCHENS—Monmouth, Illinois—Summer camp, Wyoming, 1953, married.

Gun collecting and hunting head the list of his hobbies and forest management is his chosen field of endeavor. He picked up his practical experience on the Bitterroot Nat'l. Forest in Montana with the Forest Service. Before entering the service he was an active member of Theta Chi. The Forest Service is his destiny?

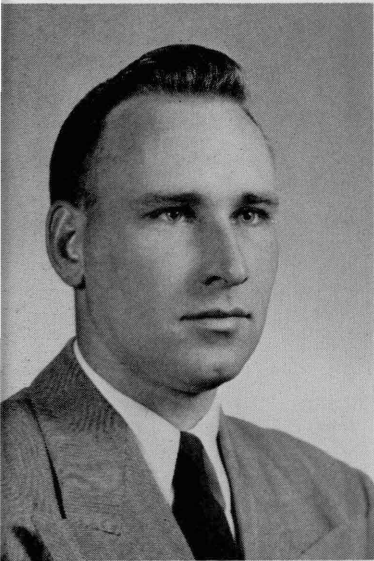
ROGER KLINOFF—Waterloo, Iowa—Summer camp, Oregon, 1955, married.

Roger's immediate plans are to make money and his method is forest management. He worked for the Rocky Mountain For. and Range Exp. Sta. in New Mexico to get his practical experience. Hunting and fishing are his hobbies.



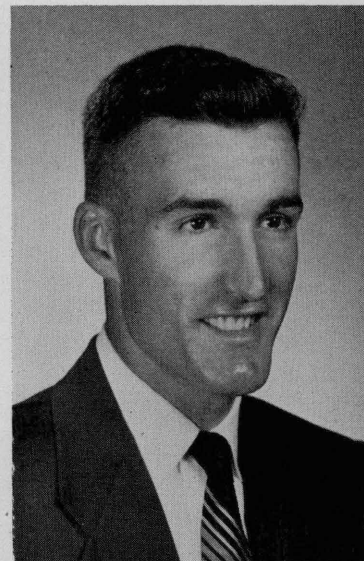
MARVIN K. LAURITSEN—Moorhead, Iowa—Summer camp, Oregon, 1955, married.

Marv has worked two summers for the Forest Service on the Chippewa Nat'l. Forest in Minnesota and plans to continue with the Forest Service after graduation. His option is forest management and his hobbies include fishing, hunting, and taxi-dermy.



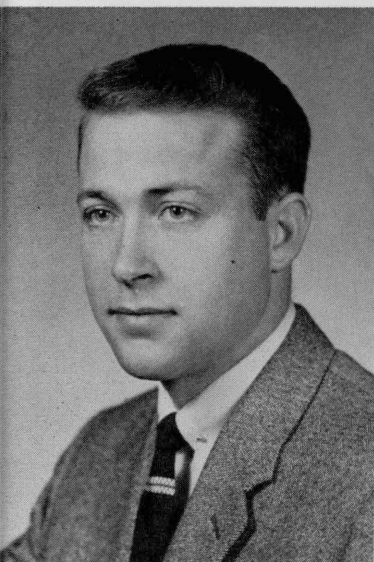
HARRY LITTLE—West Branch, Ia.—Summer camp, Wyoming, 1953.

Harry plans to be a range manager and work for the BLM. He has already worked for the Iowa Conservation Commission, the Forest Service in Wyoming, and the BLM in Idaho and Nevada.



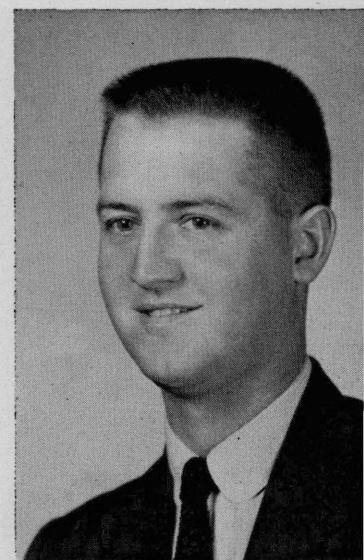
DALE MARSH—Peoria, Illinois—Summer camp, Wyoming, 1953.

Uncle Dale has spent a summer each in Oregon and Wisconsin with the Forest Service. His plans after graduation are undecided, but his field is forest management. Activities include Forestry Club and 630 Club. He was Co-chairman of the 1957 Field Days.



GENE MEYER—Storm Lake, Iowa—Summer camp, Wyoming, 1953, married.

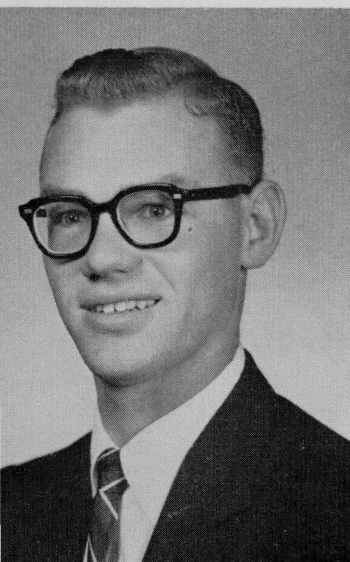
Gene's field is forest management and he plans to work for either the Forest Service or private industry. He has worked for the Iowa Conservation Commission, a retail lumber yard, the Forest Service, and spent two years in the working with aerial photos. Gene's activities include Forestry Club, Freshman Basketball, and Interfraternity Council. His hobbies are hunting and fishing.





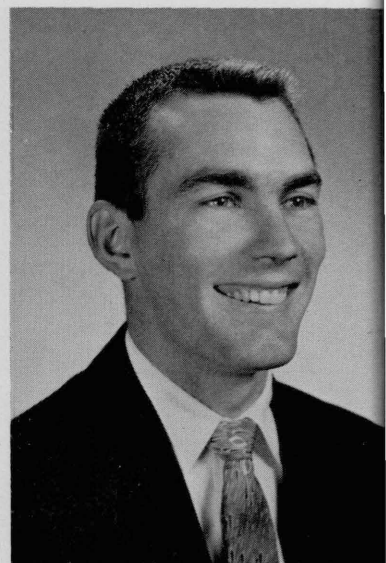
SAMUEL R. NAGEL—Stockholm, Iowa—Summer camp, Oregon, 1955.

Sam has spent a summer with the Forest Service in the Black Hills and one with the Bureau of Indian Affairs in Washington. He is in forest management and plans to work for the Forest Service. He is a member of Forestry Club, Sigma Pi, and the Society of American Foresters. Sam is a hunter.



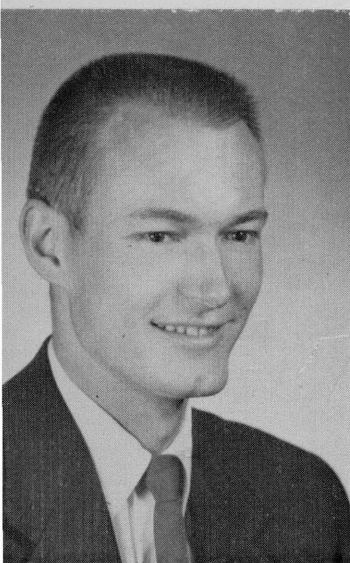
DAN PETERS—Manning, Iowa—Summer camp, Oregon, 1955, married.

Dan is in forest management and doesn't know for sure what he will do after graduation except work. His practical experience has been picked up at the nursery and at Amana. He is on the Iowa State baseball team and his hobby is sports in general.



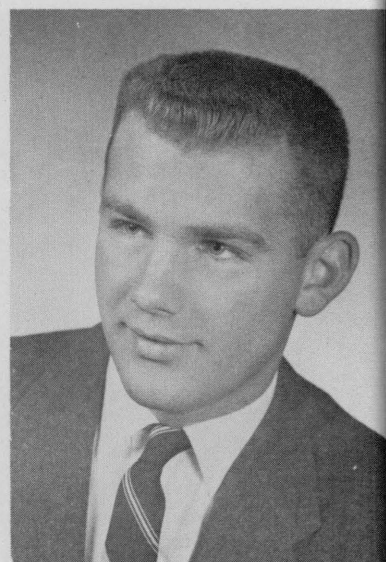
DEAN A. RASMUSON—Britt, Iowa—Summer Camp, Oregon, 1955.

Ras has spent two years with the Forest Service, one in Washington and one in Montana. His option is management and especially timber sales. His activities are secretary to the Forestry Club, Alumni Editor of the 1957 Ames Forester, and a member of the Alpha Phi Omega. He plans to work for the Army and the Forest Service after graduation. Hunting and other outdoor sports are his hobbies.



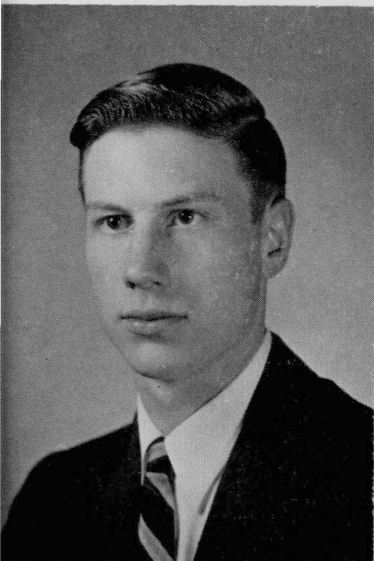
DONALD ROGERS — Muscatine, Iowa — Summer Camp, Oregon, 1955.

Don is a forest management major. He has spent two summers working for the Forest Service and plans to start work with that organization after graduation. His activities include Forestry Club, football and SOV. He is a member of Sigma Phi Epsilon social fraternity. Don's hobbies include just about any sports, but he favors riding, swimming, and hunting.



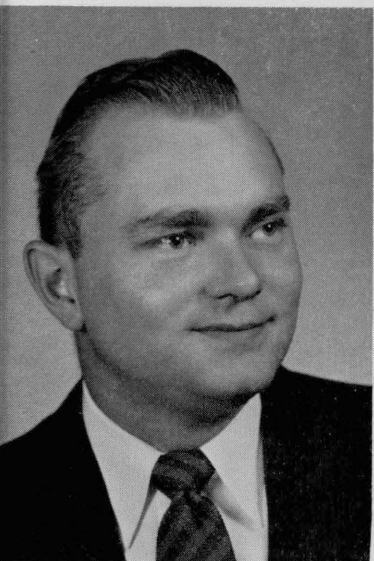
BILL RUS—Council Bluffs, Iowa—Summer camp, Oregon, 1955.

Bill has worked two years with the BLM in Oregon and plans to continue following graduation. Forest management is his option. His hobby is hunting.



HAROLD SIMPSON—Ida Grove, Iowa—Summer Camp, Oregon, 1955—married.

Harold has spent a summer with the Rocky Mountain Forest and Range Exp. Sta. working on range management which is his field. His activities include Summer Camp Reporter for the Ames Forester in 1955 and a member of the Game Banquet Comm. Uncle Sam is waiting for him to graduate. Photography and hunting make up his hobbies.



DONALD H. J. STEENSEN—Clinton, Iowa—Summer camp, Oregon, 1956, married.

Don plans to attend Duke University upon graduation and take advanced work in economics. His practical experience was with the Lake States Exp. Sta. in Wisconsin and Minnesota. He was summer camp reporter for the Forester in 1956. His hobbies include sports and reading.

GEORGE L. THOMPSON—Dakota City, Iowa—Summer Camp, Oregon, 1955.

George has spent two summers in Montana with the Forest Service and plans to continue with them in the field of forest mgt. George enjoys to hunt and fish in his spare time.



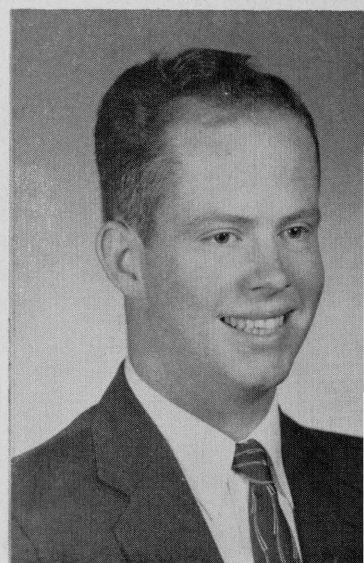
LEROY (BUD) SAYLOR—Cedar Rapids, Iowa—Summer Camp, Oregon, 1956—married.

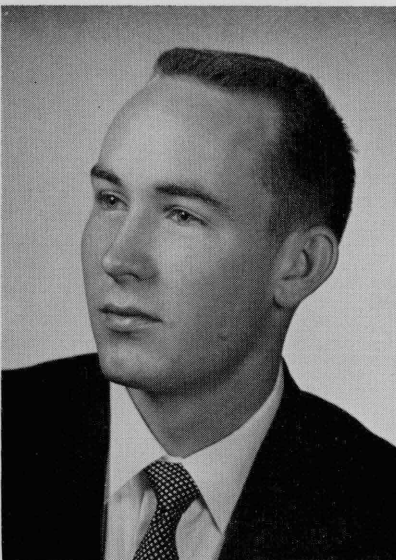
Bud is majoring in forest genetics and plans to take graduate work in this field. He has worked in the field of genetics for the Institute of Paper Chemistry at Appleton, Wisconsin. His hobbies are fishing, hunting, and golf.



ROLAND D. SMITH—Iowa Falls, Iowa—Summer camp, Wisconsin, 1951, married.

Roland's option is forest management and he plans to work for the BLM in Medford, Oregon. His previous experience includes plantation release for the Forest Service and two years with the BLM in Oregon. His hobbies include hunting and furniture woodworking.





STEIN WILLIAMS—Canton, Illinois—Summer camp, Oregon, 1955.

Skibbie's option is forest management and has worked in that field for the Bureau of Indian Affairs at Yakima, Washington, for the past two years. He is a member of the Forestry Club and calls fishing and hunting his hobbies.

JAMES JAYNE—Exira, Iowa—Summer camp, Oregon, 1955.

Jim is in forest management and has had practical experience with the dept. of forestry in a private company for the past two years. His immediate plans upon graduation include the army. Woodworking is his hobby.

KERMIT LINK—Council Bluffs, Iowa—Summer camp, Oregon, 1956, married.

Kermit's option is wood utilization and he hopes to work in administration. He has worked at the Central States Forest Exp. Sta. at Columbus, Ohio and plans to work for the Forest Service after graduation. He was on the Intercollegiate billiards team for two years. Hunting is his side interest.

RICHARD L. NEILSON—Glidden, Iowa—Summer camp, Oregon, 1955, married.

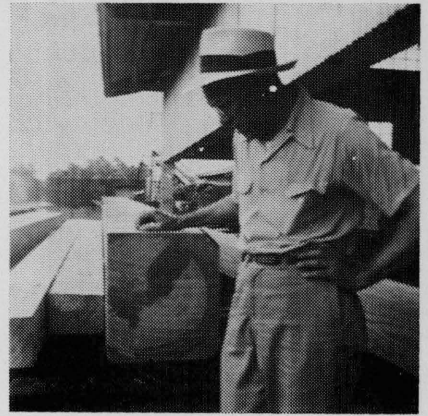
Duke is in wood utilization and plans to work in the laminated wood industry. He spent a summer with the Pacific Northwest Exp. Sta. working on the forest inventory. Sports, woodworking, and hiking are his hobbies.

THE FACULTY



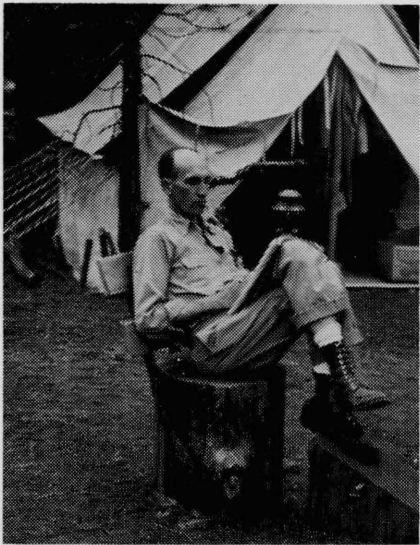
PROF. G. B. HARTMAN

Head of Department
logging and milling
wood preservation
lumber industry



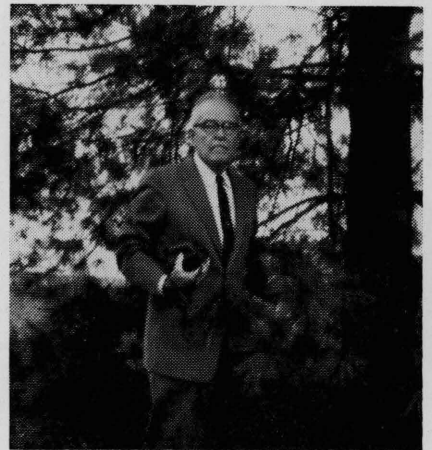
DR. D. W. BENSEND

products
wood technology
seasoning
graduate research



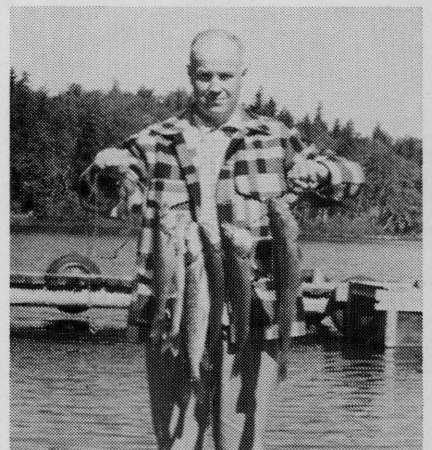
PROF. G. B. MacDonald

general forestry
conservation
(partial retirement)



DR. G. W. THOMSON

mensuration
photogrammetry
farm forestry
Forestry Club advisor



DR. A. L. McCOMB

silviculture
forest influences
graduate research



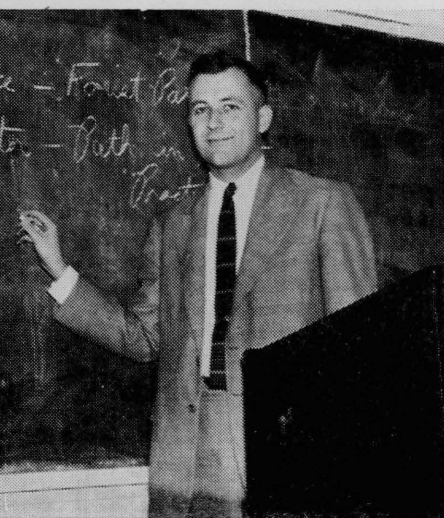
PROF. G. E. GATHERUM

silviculture
range management
Holst Tract advisor



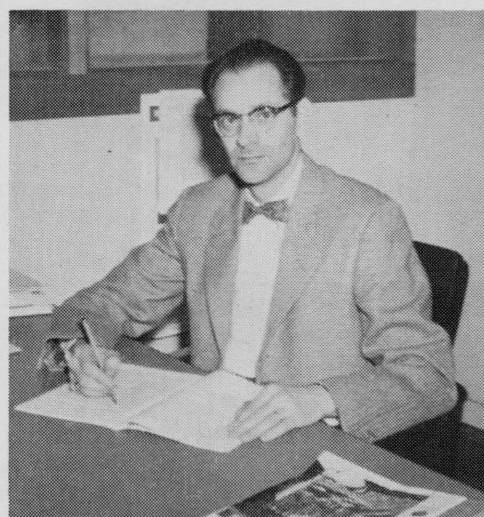
PROF. L. F. KELLOGG

general forestry
management
protection
Ames Forester advisor



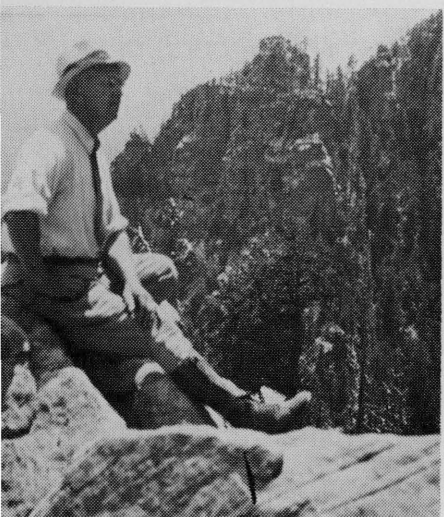
DR. H. S. McNABB

forest pathology
wood deterioration



DR. I. I. HOLLAND

general forestry
economics
finance
policy and
administration



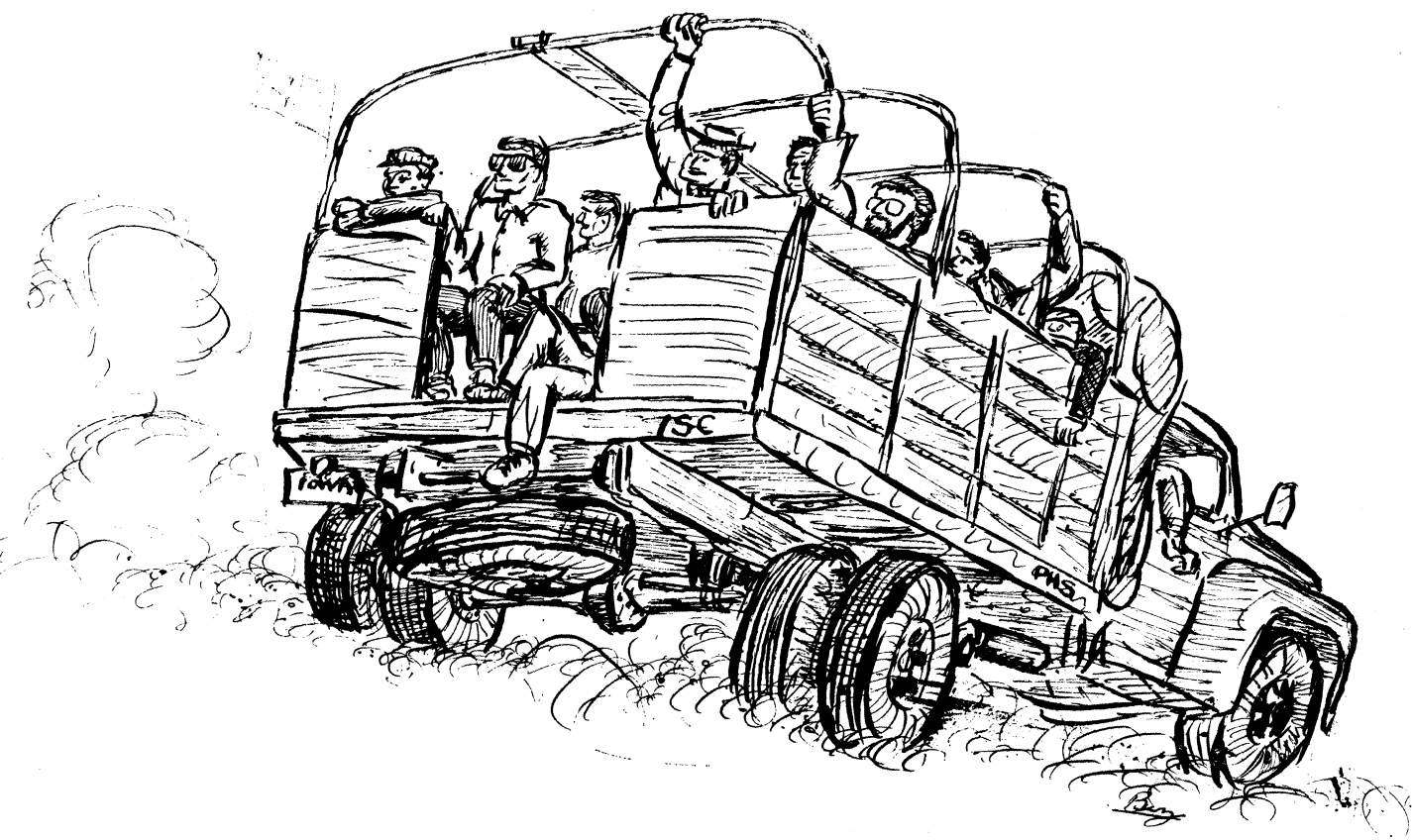
PROF. J. A. LARSEN

(partial retirement)



MARIAN BENDER

departmental
secretary



Summer Camp

Summer Camp 1957

For the first time in many years, the I.S.C. Foresters headed southeast to make their camp in North Carolina. Breaking all traditions of tent camps, we spent a summer of comparative luxury in the facilities furnished us by the Department of Forestry at North Carolina State College.

The first five weeks were spent in the mountainous area of Southwest North Carolina in the Nantahala National Forest. The first day, under the expert supervision of Dr. Bensend, camp director, was spent in a general cleanup of the camp. Because of the fact that we had no tents to set up, no firewood to cut, and no latrines to dig, the work was very light.



Studying watershed management.

The next day, the arranged schedule of classes began. We were split into two sections, alternating between mensuration, under Dr. Thompson, and silviculture, under Prof. Kellog. Then we were grouped for forest operations and utilization under Dr. Bensend and Ray Renaud.

Our cruising area was a dendrologists delight but a mensurationists nightmare. The northern and southern forests came together here, so we found just about every imaginable species of tree. We finally tallied them into about six different species groups, but not having had denrology yet, we were still uncertain except for a few juniors and seniors who seemed to know a lot about quite a number of things. We were also blessed by the presence of both rattlesnakes and copperheads, which only added to our enjoyment of cruising.

In silviculture, the trip that stands out in our minds, is the one to Fires Creek Area. We all gained about five pounds—from eating dust. Upon our return, our private pool turned about three shades darker as we all dove in, clothes and all.

Our forest operations and utilization trips proved



So that's what foresters do!



The South will rise again.



Meanwhile, in the jungle.

very interesting, as we toured the country in our open air limousines, wearing calouses on our posteriors. Unfortunately, our ever alert, bright eyed, always thoughtful truck drivers, never seemed to manage to slow down till after we had passed over a bump. Perhaps this was due to the fact that they spent many an hour, late into the night . . . studying? Yet, we will always remember them for the magnificent role they played in the now famous "Battle of the Canteen Water." It was here that truck one caught truck two at a stop light, bravely pulled alongside, and fought a tremendous water fight to a standstill. This was

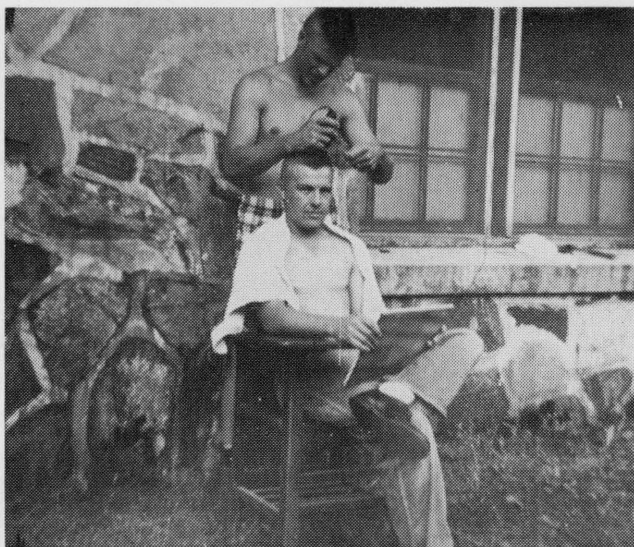


Potatoes . . . UGH!!

undoubtedly the first time any Southern community ever had its mainstreet flooded when it hadn't rained for a week.

Despite all this, we were always able to regain our strength on the weekends, as North Carolina was a tourists delight. After being slicked up, or should we say 'butchered' by our local barber, we were off to Franklin, Highlands, or Rabun Lake.

After five weeks in this camp, we said goodbye to the trees that were "quivering to be cut," and the refreshing smell of fermenting moonshine that hung over the hills.

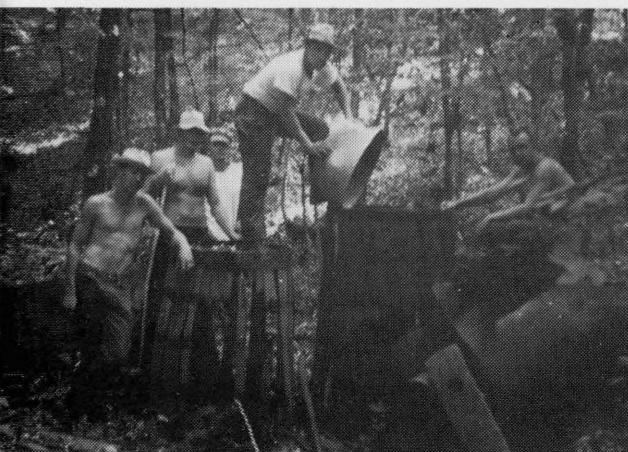


Summercamp barbershop.

Our second camp was located about twenty miles from Durham N. C., in the heart of the Piedmont area. Here life was a little different. The temperature reminded us of Iowa . . . hotter than H---. We missed the cooling rains which had come so regularly, but in a few days we were used to it, and settled down to make the best of it.

Here, forest operations and utilizations dominated the schedule, with trips to Virginia, South Carolina, and the coast. Since N. C. is number one in the manufacture of fine furniture, we had the opportunity to visit some very modern plants.

Although busy with the side trips, we still managed to do a ten percent cruise on the Hill Forest. The only major problem we encountered was in keeping our compass lines running straight, but after we had overcome this, we were able to proceed in a fairly orderly fashion. Silvics was spent in learning the finer art of taking measurements and putting them into a useful and legible form.



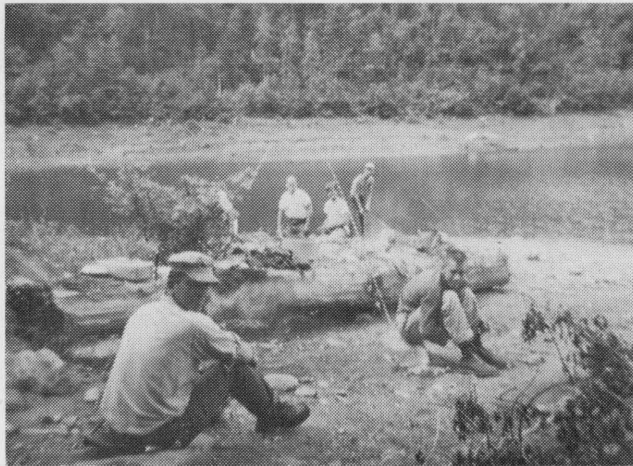
Science with Practice!?!?



I see a blue bird.



WOW!!!!



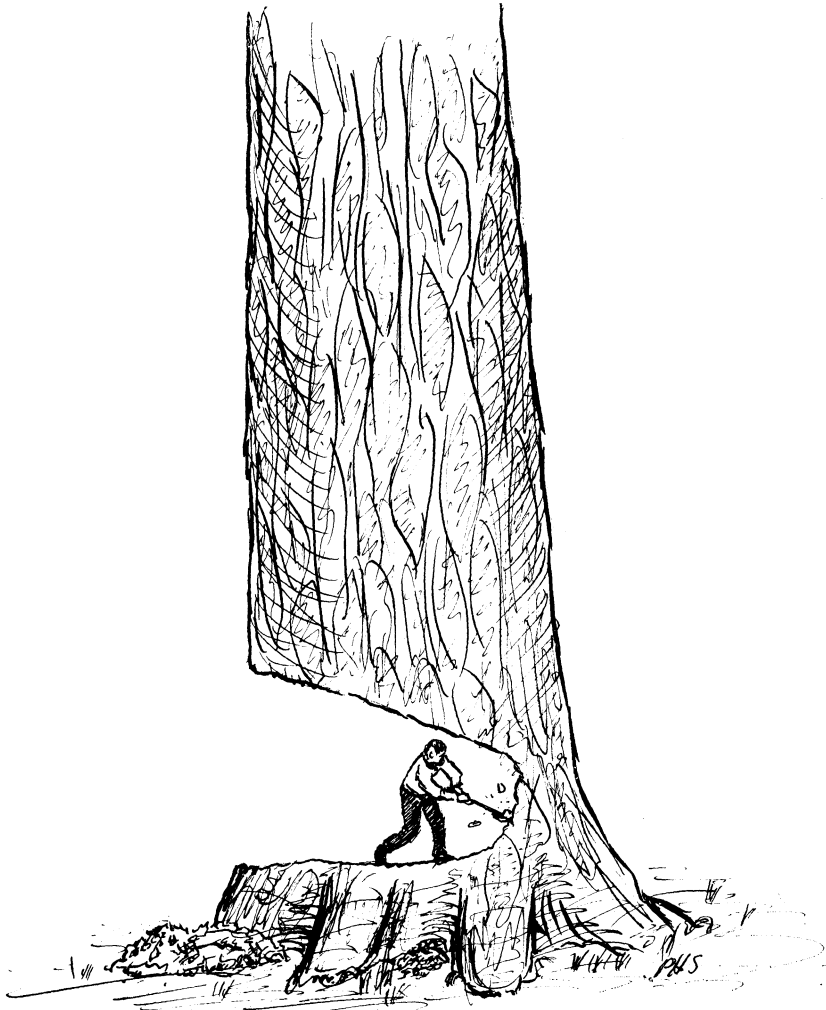
I spy!

Again the weekends were looked forward to, as Washington D. C. and Myrtle Beach were not too far off. We also got together a softball team of sorts and challenged the local aggregation. Although we never beat them, they had to go all out in order to keep their record unblemished.

Finally the time came for closing camp and heading home. The wonderful hospitality of the South, in so many ways, will long be remembered and appreciated.



Enjoying the sunny comforts of North Carolina



Activities



Row 1: Ed Whitmore, Dwyane Warrick, Bob Pfister, Bill Jensen, Cliff Fago, Dick Dyrland, Ken Hillman, Ed Hill.
 Row 2: Hilton Muntz, Gene Meyer, Dave Nelson, Harry Little, Jim Ficke, Bob Hetzer, Hugh Hardie, Don Rogers.
 Row 3: Roger Wilke, Bob Franklin, Tom Spolar, Dick Cone, Howard Halverson, Bob Brisbin, Calvin Norton.
 Row 4: Dr. Thomson, Jim Teeters, Bill Conklin, Fred Walk, Lowell Tripp, John Pearson, Mel Clausen, Roland Smith.
 Row 5: Roger Brinck, Lee Hanks, Phil Sommerfeld, George Tompkins, Dick Freel, Sam Nagel, Faye Houtchens, Stein Williams, Roger Klinoff.

FORESTRY CLUB

Club Officers

FALL

SPRING

<i>President</i>	Hilton Muntz.....	Gene Meyer
<i>Vice President</i>	Dick Freel.....	Roger Klinoff
<i>Treasurer</i>	Dave Nelson.....	Tom Spolar
<i>Secretary</i>	Hugh Hardie.....	Greg Brown
<i>Sr. Ag Council Representative</i>	Dave Nelson	
<i>Jr. Ag. Council Representative</i>	Dean Baker	
<i>Faculty Advisor</i>	Dr. Thomson	



Open House

The age old tradition of having Forestry Open House in the outdoors atmosphere of the tent was finally broken last year, as open house moved to the second floor in Curtiss Hall.

An outdoors atmosphere was provided, however by two 10 year old red pines which decorated either side of the entrance into the exhibit.

The first display on entering the hall was a typical foresters desk. This was set up by Darrel Keller. On it were displayed some of the tools most commonly used by the average forester.

The forest crop, displayed by Erwin Hafenstein, consisted of a diagram depicting how the forest is cut on a rotation and cutting cycle for sustained yield.

Production of mahogany plywood on a miniature hot press proved to be one of the most interesting displays in this years open house. Free samples of the quartered mahogany plywod were distributed to the spectators.

A display on wood products was prepared by Dick Freel. It consisted of samples of specialized wood products manufactured from such things as laminated wood, impreg, and fiber board.

A model sawmill, which was obtained from the State Conservation Commission, was used to demonstrate how logs are sawn into lumber. Bob Watkins and Greg Brown were the "head sawyers" for this operation.

A display on forest pathology showed the effect of many different diseases on the various species of trees. This was organized by Mary Schwarte with the assistance of Dr. McNabb of the Botany Department.



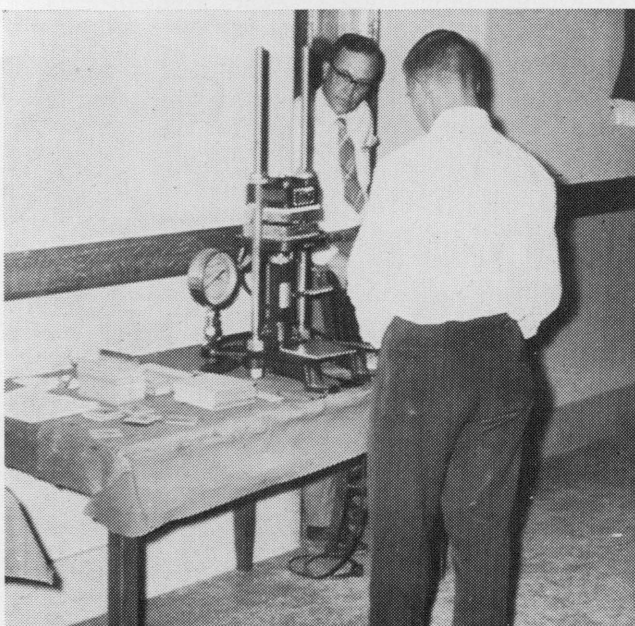
Second Floor Curtiss.

Hugh Hardie and George Tompkins set up a pictorial display on the multiple use of our forests. A topographic map was used to show where the different uses predominate.

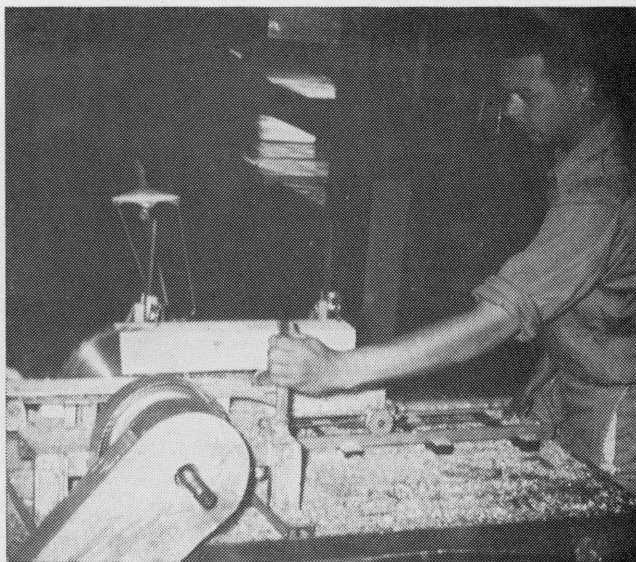
To illustrate where opportunities exist for Iowa State forestry graduates, the location of each graduate was pinpointed on a large scale map of the United States. Bill Rus was in charge of this display.

Red pine and Austrian pine seedlings were passed out to the visitors of forestry open house.

The purpose of open house this year was to point out the many varied fields of forestry, the opportunities existing for forestry graduates, and as always to make the populace more aware of the importance of forestry.



Making Plywood

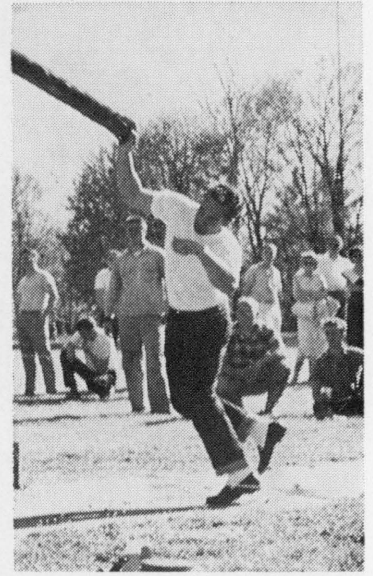


Miniature sawmill.



Up, up and away!

Paul Bunyon Days



Uummmppphhh !!!!

AMID the roaring and cheering spectators in front of Curtiss Hall, the Foresters put on their an-lights of the Saturday afternoon Veishea program.

Professor Hartman presented Don Schramm with a double-bitted axe to signify Don's being honored as "Son of Paul". Special guest of the foresters and Paul Bunyon Days was Veishea Queen Virginia Dorn.

After the chips and dust from the furious competition of the contests had settled, M.C., Don Schramm, awarded the prizes to the winners. Some new champions arose, while others retained their titles.

Tom Spolar took over the honors of "speediest chopper".

Lee "Moose" Andreas and Dick Cone swept away the log bucking crown. Moose also retained his re-

nowned title of "King of the Log Throwers".

The steady hands and keen eyes of Dave Nelson helped him win the match splitting prize.

A three way tie between John Hazard, last year's pole climbing champion, Don Rardin, and Dick Hanson finally ended after several heats with the judges' decision of a tie between Hanson and Rardin.

From the icy green waters of Lake La Verne arose two new canoe tilting champions, John Koning and Dick Dyrland.

Already plans are being made for one of the biggest and most complete Paul Bunyon Days of all. Perhaps some of the alums will enter the ring to add an extra lively bit of competition. Truly Paul Bunyon Days will be an outstanding Veishea event in 1958.



SPLASH!!!



Push-pull, push-pull!!

Conclave

THE FOURTH ANNUAL CONCLAVE was held May 3, 4 and 5, 1957 at Lafayette, Indiana. Purdue University Forestry Club was the host.

Sycamore Valley Girl Scout Camp was the site of the meetings and contests. The accommodations were very complete except for the Girl Scouts.

The conclave was dedicated to the Late Professor Ted Shaw of Purdue University.

About fifty foresters from Iowa State College, University of Minnesota and Michigan State University, as well as a healthy turnout from Purdue University, witnessed the contests and meetings.

Festivities began Friday evening with registration



Yea Team!

and bull sessions. Saturday morning, the group toured the Purdue Campus.

The traditional contests were held Saturday afternoon. These tests of skill and muscle consisted of log chopping, rail splitting, match splitting, log bucking log, throwing, log rolling, chain throwing and tobacco (ptui) spitting.

Purdue swept its third consecutive conclave championship with 39 points. Michigan State nailed down second place with 25 points. The undermanned Iowa State delegation made a good showing with 22 points for third place. Minnesota chined last place with 13 points. On a points per man basis, Iowa State was way ahead of the other three schools. Seven men carried the load for Iowa State.

Iowa State contest winners were as follows:

Log chopping	second place	Tom Spolar
Log splitting	second place	Hilton Muntz
Chain throwing	third place	Dick Dyrland
Tobacco spitting	second place	Hilton Muntz
One man bucking	third place	Dick "Hondo" Dyrland
Traverse and pace	first place	John "Hop" Hazard
Traverse and pace	third place	"Hondo" Dryland
Log throwing	first place	Lee "Moose" Andreas



This is the way it's done boys!

Before the contests started, the feature speaker, Paul Criss, entertained the troops with his "Master's Thesis" on Paul Bunyan. Criss also proved his dexterity with an axe by shaving the Purdue Forestry Club president with his three and one half pound double bitted axe.

Saturday evening was topped off by the traditional "get-together."

The conclave was closed Sunday morning and the foresters scattered to the four winds with the promise to return next year to Michigan State.

Many new friendships were made and old acquaintances were renewed. After it was all over, everyone had the feeling that he was proud to be a forester.

A conclave may be summed up by saying, "Don't Miss It!".



"Have Axe, Will Travel."

Hoe Down

THE annual Forester's Hoe Down was held last spring at the Ames Country Club.

To the refreshing strains of soft music the foresters, their dates, the faculty, and their wives danced the evening away.

Decorations and punch made by the Forestry Student Wives Club added the finishing touches to the Hoe Down.

This years Hoe Down is expected to be a costume affair with a theme based on those fabulous loggers from the great north woods.



Fall Camp Fire

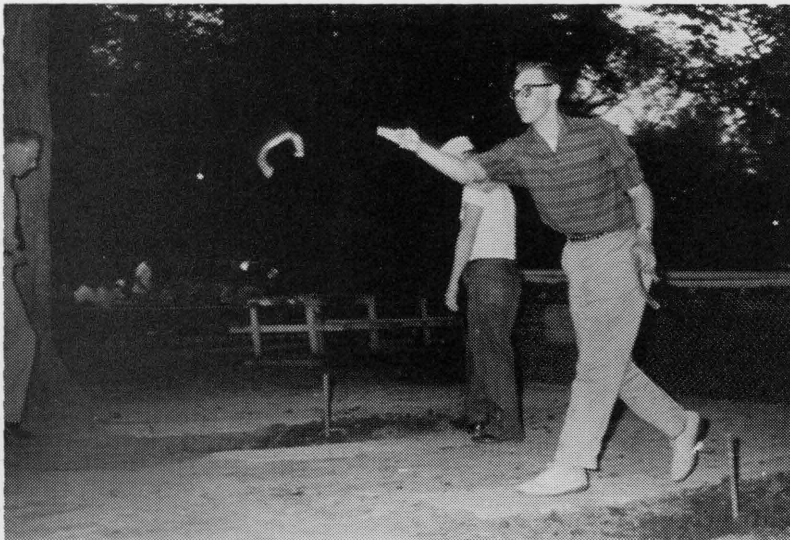
If ever tall stories were told, it was at the annual Fall Campfire. Neither the huge amounts of food consumed nor the call to order of the club meeting could quiet these foresters back from summer jobs all over the country or from summer camp.

"Sourdough" Hillman was back from Alaska, "Skibbie" Williams was back from Washington, "Blue Bird" Cukurs was back from "moonshine heaven" in North Carolina, along with all the rest of the fabulous I.S.C. forestry crew.

The songs that were sung and the stories that were told defied all imagination. This was one of those great nights when everyone was in high spirits and back together again.



Ummmmm!!



Working up an appetite.

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Brookside Park.

The air was fragrant with the breath of the warm spring night, suddenly the stillness was shattered by a horrible noise that sounded like someone singing. Why of course! It was the foresters annual Spring Campfire.

Not only were the guys there but also the gals too. This was strictly a highly integrated operation with very loose management.

After several wild and rugged games of volleyball, in which Doc. Thomson proved to be the outstanding athlete, because of his agility and ability to reach over the net, everyone headed for the chow line.

Some outstanding story telling soon followed, then Hilton Muntz and his protege gave a fine exhibition of banjo picking, this was followed by a very interesting talk by one of the professors from the zoology department. Finally, after a full evening of fun and entertainment, another Spring Campfire came to an end.

Holst Tract

THROUGH the combined efforts of the Holst Tract Committee, the forestry students, and the excellent cooperation of the Iowa State Conservation Commission, quite a change has come over the Holst Tract.

The pine plantation is growing rapidly in area and size, with very interesting results. Several experimental areas concerned with site and aspect and using various pine species are well underway.

The new parking area is nearing completion, new gates will be installed this spring, and all signs are now in excellent condition.

This spring considerable emphasis will be placed on expansion of the pine plantation and improvement of the road system. Several areas will undergo spray treatments later on in the spring. It is also ex-



Watershed management at the Holst Tract.

pected that the new equipment and maintenance building will be completed sometime this summer.

The time has arrived where the Holst Tract is showing the efforts of several years work and is now presenting a multitude of new challenges and opportunities in forest management to the Iowa State Foresters.

Game Banquet

ON FEBRUARY 22 the foresters laid aside their hobnail boots and logging togs long enough to don a suit and tie and enjoy a fine venison dinner at the annual Game Banquet.

The guest speaker this year was F. G. Kilp, manager of woodlands operations for Nekoosa-Edwards Paper Co. He spoke on industrial forestry and the progress that is being made in forest management by Nekoosa-Edwards and other private firms. After his talk Mr. Kilp showed some very interesting movies on mechanical forestry operations, wildlife, and wild flowers.

Master of ceremonies, Lee Andreas, introduced Dr. Thomson, Forestry Club advisor, who revealed the results of the recent election of Forestry Club officers.



Co-chairmen Bill Swanson and Terry Cooper aided by Bruce Brown, Greg Brown, and Harold Simpson upheld tradition and produced a very fine Game Banquet.



Alum of the Year

Cecil G. McLaren

C. G. McLaren was born September 28, 1904 in Altoona, Kansas. He moved to Olathe, Colorado in 1908 with his parents where the chief occupation of the family was cattle raising, sheep raising and saw-milling on the Uncompaghrue National Forest. He graduated from Montrose County High School, Montrose, Colorado in 1923, entered Iowa State College, Ames, Iowa in the fall of 1923, taking a course in Civil Engineering and Forestry. He received his B.S. degree in 1927.

Mr. McLaren earned all college expenses by taking summer-time employment, one-half year's leave from school and working for the college library. This employment was with the U. S. Forest Service and the Michigan Department of Conservation as instrument man with survey parties.

While in college he took a course in the Chemistry of Forest Products which directed his attention to the Paper Industry.

In 1927 he entered the employ of the Nekoosa-Edwards Paper Company at Port Edwards, Wisconsin. From there he went with Banzhaf and Watson Engineers, Milwaukee, Wisconsin, who were engaged in making surveys for various paper companies.

From Banzhaf and Watson he went to Marathon Paper mills Company at Rothschild, Wisconsin. From Marathon he transferred to the Tomahawk Kraft Paper Company, heading the Timberlands Department and gradually becoming active in the management of the Company. In 1938 he was elected a director of the company.

In May 1946, National Container Corporation acquired the Tomahawk Kraft Paper Company and when the president and general manager, Mr. S. B. Bugge, announced his retirement as of August 1, Mr. McLaren was appointed vice president and general manager. In April 1953, he was elected to the directorate of the parent corporation, National Container Corporation of Delaware, and in January 1955 he was appointed vice president in charge of mills.



In October 1956, National Container Corporation merged with Owens-Illinois Glass Company, and Mr. McLaren was elected vice president of Owens-Illinois Mill Division in charge of mills. On April 17, 1957, he was elected a vice president of Owens-Illinois Glass Company.

On August 1, 1947, the Tomahawk Timber Company was organized to operate on the Superior National Forest, and Mr. McLaren became president. This company runs the largest pulpwood operation in the Lake states and was owned by Nekoosa-Edwards Paper Company, Mosinee Paper Mills Company, and National Container Corporation. In January, 1953, Nekoosa-Edwards Paper Company, and Mosinee Paper Mills Company took over the interest of National Container Corporation, but Mr. McLaren still holds the office of president and director.

In addition to the above, Mr. McLaren is a director of: Wisconsin Valley Improvement Company, Wausau, Wisconsin; Trees for Tomorrow, Inc., Merrill, Wisconsin; Forest Industries Information Committee, Oshkosh, Wisconsin.

Mr. McLaren is a vice president and director of the Valdosta Southern Railroad, the Marinette, Tomahawk & Western Railroad, and Owens-Illinois of the Bahamas, Ltd.

He is married and has three daughters and one son, and resides at 3407 Bentley Blvd., Toledo, Ohio.



L. to R.: Dyrland, Rasmuson, Baker, Nelson, Comstock, Prof. Kellogg, Ficke, Dahlquist, McCullough.

The Staff

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Alumni and Advertising Directory

EDITORS NOTE: If you have information concerning the whereabouts of any of the alumni whose addresses are "Unknown," the editors of the AMES FORESTER would appreciate hearing from you.

1900

MAST, W. H., 380 Brady St., Davenport, Iowa. *W. H. Mast Nursery.*

1904

MERRITT, MELVIN L., 3017 N.E. 28 Avenue, Portland 12, Oregon. *Retired (United States Forest Service).*

1907

BATHIS, RUSSELL FOREST, Texas Forest Service, Kirbyville, Tex., *Self employed.*

1908

BAXTER, W. G., 664 Radcliffe Ave., Pacific Palisades, Calif. *Landscape Gardener, Sawtelle Veterans Hospital.*
HAEFNER, HENRY, 4242 Northeast Failing St., Portland 13, Ore., *Retired.*

1909

ALLEN, SHIRLEY, 820 Daniel St., Ann Arbor, Mich., *Professor of Forestry, Emeritus, University of Michigan.*

1911

FREEMAN, FRANK G., 1928 Greenleaf St., Santa Anna, Calif., *Insurance.*
HOFFMAN, ARTHUR F. C., 1111 South St. Paul, Denver 10, Colo., *Retired (U. S. Forest Service).*
KOEPE, W. C., *Address Uncertain.*
REYNOLDS, LeROY A., 6319 - 33rd St. N.W., Washington 15, D.C., *Retired.*
SMITH, PERCY T., 309 - 29th St., Sioux City 4, Ia., *Animal Feed Department, Cudahy Packing Company.*
WHITHAM, J. C., 1014 South 6th Ave., Bozeman, Mont., *Retired.*

1912

LESSEL, L. R., 501 East 19th St., Silver City, N.M., *Retired.*
O'BANION, A. C., Fertile, Minn.
RINGHEIM, H. I., Box 25, White Rock, B.C., Canada, *Retired.*
RICHMOND, HOWARD H., Cass Lake, Minn., *Timber Producer.*
SMITH, WILLIAM A., *Address Uncertain.*
TRUAX, THOMAS R., 3813 Council Crest, Madison, Wis., *Chief, Wood Preservation Division, U.S. Forest Products Laboratory.*

1913

BAXTER, L. J., Galva, Ia., *Farming.*
CLARK, H. B., 5001 Nicholas, Omaha, Neb., *District Manager, A. E. Robinson Company, Irrigation Engineers.*
HENSEL, R. L., *Address Uncertain.*
STEFFEN, EDWIN H., 1808 Monroe St., Pullman, Wash., *Retired.*
WATTS, LYLE F., 1426 N.E. Thompson St., Portland 12, Ore., *Retired (U.S. Forest Service).*

1914

HASSEL, W. C., 1158 J. Ave., N.W., Cedar Rapids, Ia., *Penick and Ford, Incorporated.*
HAYES, RALPH W., Baton Rouge, La., *School of Forestry, Louisiana State University.*
NAGEL, WILLIAM M., 1728 Maurice Ave., Missoula, Mont., *Retired.*
STERETT, JOHN C., 701 West St., Charles Road, Elmhurst, Ill., *Real Estate.*
VAN BOSKIRK, S. S., 115A North 12th St., Fort Pierce Fla., *Retired (U. S. Forest Service).*
WOLF, E. T., *Address Uncertain.*
WOLVIN, RAY M., 1022 West 19th St., Santa Ana, Calif., *Retired.*

1915

BODE, IRWIN T., 1917 W. Mountain, Glendale, Calif., *Retired.*
HARLEY, WILLIAM P., 1506 Park Ave., S.W., Albuquerque, N. Mex., *President, J. C. Baldridge Lumber Company.*
HICKS, LOWELL E., *Address Uncertain.*
SCHRECK, R. G., East Tawas, Mich., *Owner-Manager, R. G. Schreck Lumber Co.*
SMITH, R. P., *Address Uncertain.*

1916

CASSIDY, H. O., *Deceased.*
CORNELL, HARVEY H., *Address Uncertain.*
GEISLER, MAX, 1728 S. Mich. Ave., Chicago 16, Ill., *Advertising Manager, The Harry Alter Company.*
MCARTHY, C. C., Webster City, Ia., *City Manager.*
JONES, G. C., *Address Uncertain.*

1917

HARTMAN, GEORGE B., 2013 Sunset Drive, Ames, Ia., *Head, Forestry Department, Iowa State College.*
HENRY, A. S., 6320 Roosevelt Road, Oak Park, Ill., *Sales Manager, Austin Brothers Construction Co.*
QUINT, J. HARLEY, 611 Olmstead Drive, Glendale, Calif., *Dentist.*
VEACH, CLAUDE H., *Address Uncertain.*

1918

DAVIS, E. M., 3121 Oxford Road, Madison, Wis., *Principal Wood Technologist, U.S. Forest Products Laboratory.*
DONAHOO, JOHN F., *Address Uncertain.*
HADLOCK, FRANK D., Route 1, Rummerfield, Pa., *Retired.*

1920

BAKER, C. J., 5308 Clinton Ave., Minneapolis, Minn., *Teaching.*
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FLETCHER, R. A., *Address Uncertain.*
HOYER, VERNE B., Box 554, Cottage Grove, Ore., *Self Employed. Public Accountant.*
LOY, E. C., 816 Woodland Ave., Kalispell, Mont., *Owner, Cleaning Establishment.*
MOORHEAD, JOHN W., 1330 Josepine St., Berkeley 3, Calif., *Senior Technician-Radiation Laboratory, University of Berkeley.*
MORRELL, FRED W., 707 Beverly Drive, Alexandria, Va., *Forester, American Pulp and Paper Association.*
WALL, LLOYD A., Box 392, Taos, N. M., *Retired.*

1921

AVERY, N. A., Laramie, Wyoming, *Assistant Supervisor, Medicine Bow National Forest.*
CORMANY, CONRAD P., 240 Melrose Ave., Kenilworth, Ill., *Self Employed.*

1922

BUCK, K. J., 418 South 38 Ave., Apt. 31, Omaha 3, Neb., *U. S. National Bank.*
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LING, WEN MING, Chengtu, Szechwan, China, *Vocational Agriculture, University of Nanking.*
MORAVETS, F. L., 5236 Southwest Burton Drive, Portland, Ore., *Chief of Forest Economics, Pacific Northwest Forest and Range Experiment Station.*
MORRIS, ROGER D., 5518 North Wilshire Drive, Tucson, Ariz., *Retired U. S. F. S.*
POHLE, EDWIN W., 1402 South First St., San Jose 10, Calif., *Owner-Manager, Southern Lumber Co.*

1923

BOGEN, A. J., *Address Uncertain.*
PROUT, CLARENCE W., 5552 - 24th Ave., South, Minneapolis 17, Minn., *Deputy Commissioner, Minnesota Department of Conservation.*
TRENK, FRED B., 2606 Gregory St., Madison 5, Wis., *State Extension Forester, University of Wisconsin.*
WATKINS, E. W., 4332 Southwest Lobelia St., Portland 1, Ore., *Bureau of Construction, Public Works Department, City of Portland.*

1924

MARTIN, CHESTER W., Old Post Road, Old Lyme, Conn., *State Park and Forest Commission.*
MILLER, ALLEN F., 4605 So. 31st Road, Apt. 1, Arlington, Va., *Assistant Chief, Division of Recreation and Lands, U.S. Forest Service.*
RUTTER, FRANK J., 2301 No. Racine Ave., Chicago, Ill., *Huss Lumber Company.*

1925

CORRELL, LYNNE M., 6051 21st St. North, Arlington, Va., *Director, Division of Personnel Management; U. S. Forest Service.*
DURRELL, GLEN R., 1324 N. Washington, Stillwater, Okla., *Head, Department of Forestry, Oklahoma A & M College.*
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TOWNE, CHARLES R., 656 Meeker, Delta, Colo., *Retired.*

1926

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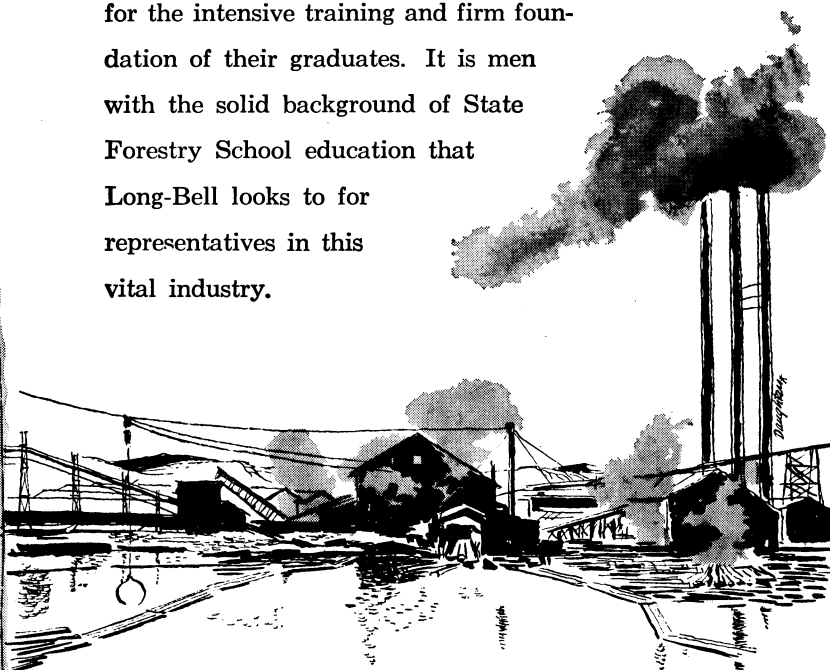


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1927

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 JACKSON, MARION D., Wausaw, Wis., *Employer's Mutual Insurance Company.*
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 NAGEL, JOHN P., 401 Campus Ave., Pullman, Wash., *Chairman, Dept. of Forestry & Range Management, State College of Washington.*
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 TURNER, GEORGE A., Route 2, Box 64A, Rolla, Mo., *District Ranger, Mark Twain National Forest.*
 VINTON, E. L., P. O. Box 463, Viroqua, Wis., *District Forester, Wisconsin Conservation Department.*
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1928

ARMSTRONG, GEORGE W., Federal Building, Los Angeles 12, Calif., *Supervisors Staff, Angles National Forest.*
 BALL, DONALD R., 11 Estrella Ave., Piedmont, Calif., *Assistant Regional Forester, U. S. Forest Service.*
 BATTELL, SAM, General Delivery, Liberty, Tex.
 BOECKH, FRED E., 1015 - 2nd St., International Falls, Minn., *Assistant General Manager, Falls Division, Minnesota & Ontario Paper Co.*
 HILL, EDWIN, 4105 Faunack Ave., Madison, Wis., *Assistant State Conservationist, Soil Conservation Service.*
 IVERSON, RAY C., 418 Dahl St., Rhinelander, Wis., *Assistant Supervisor, Nicolet National Forest.*
 KAHLER, LESLIE H., State Tree Nursery, Jonesboro, Ill., *Superintendent, State Tree Nursery, Illinois Division of Forestry.*
 KREAGER, PAUL T., St. Marks, Fla., *Refuge Manager, St. Marks National Wildlife Refuge.*
 LESTER, ORVILLE F., Route 1, Indianola, Ia., *Farming.*
 LEPPLEY, WILLIAM M., 525 N. Holmes St., State College, Penn., *Professor of Psychology, Penn. State University.*
 LAU, VICTOR C., 635 Georgiana, Port Angeles, Wash., *Crown Vellerbach Paper Company.*
 LUNDBERG, R. O., *Address Uncertain.*
 MEGINNIS, H. G., 188 Tacoma Circle, Asheville, N. C., *Chief, Divisions of Watershed Mgt. & Range Mgt. Research, Southeastern Forest Expt. Sta.*

PETERS, GEORGE J., 317 Mulberry St., Montoursville, Pa., *Flood control Work, U. S. Army Engineers.*
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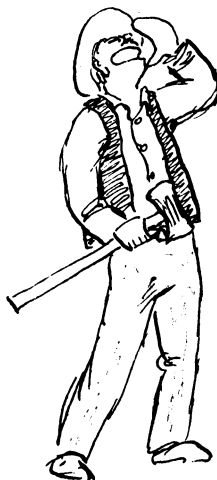
1935

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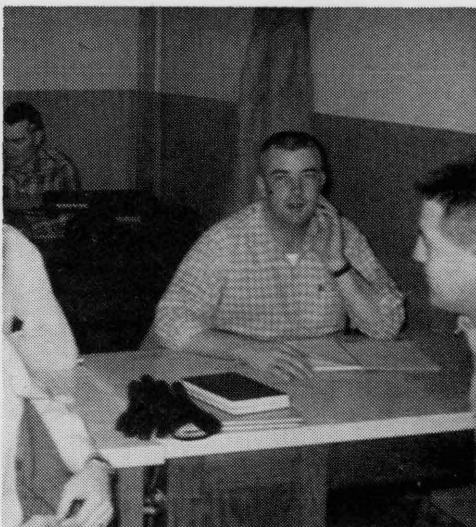
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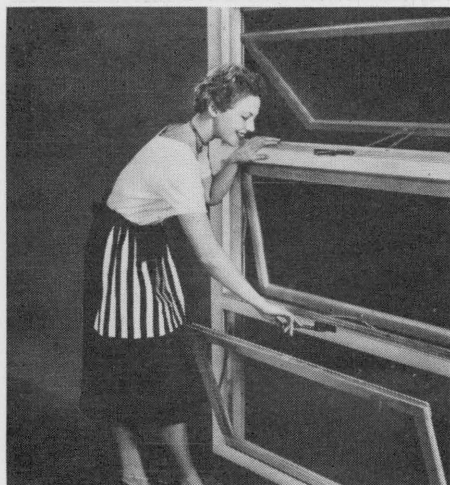
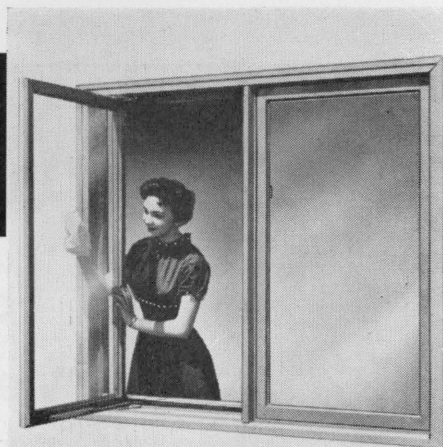
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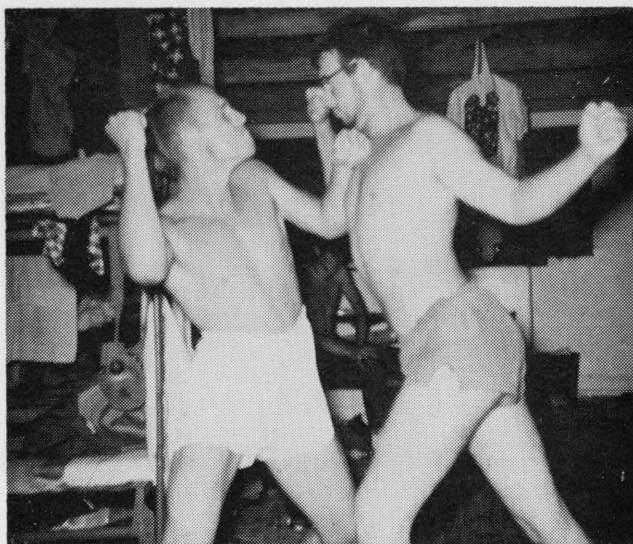
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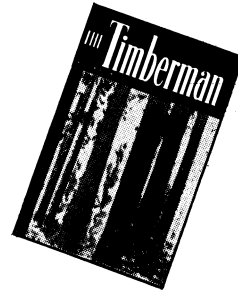
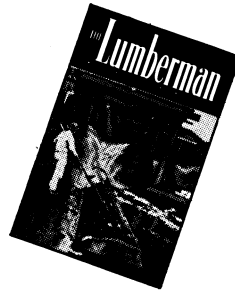
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